University of Texas Bulletin
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WITH AN INTRODUCTION
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Bureau of School Inquiry
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The benefits of education and of useful knowledge, generally diffused through a community, are essential to the preservation of a free government.

Sam Houston

Cultivated mind is the guardian genius of democracy. . . . It is the only dictator that freemen acknowledge and the only security that freemen desire.

Mirabeau B. Lamar

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INTRODUCTION

BY T. H. SHELBY

How many years should be given to elementary, or pre-secondary education, or to both elementary and secondary education? The answer is not a simple one to give. It depends upon who is asked and, to some extent at least, where he lives. It depends in large measure upon the system to which the person asked has been accustomed and upon the individual who has been his teacher.

If one traces the history of American education, he finds that practice has varied with respect to this matter, both as to time and as to place. Many schools of the northeastern section of the United States in the early days extended their elementary course to nine and even ten years. The eight-year system for elementary schools seems to have had its beginning in Ohio, in the early stages of public education in that state and to have spread rapidly into the Central West. Until recent reorganization movements began, eight-year systems were found in the North and East and seven-year systems in the Southern states.

A notable example of a seven-year system is Kansas City, whose system was inaugurated in 1867 with a seven-year elementary course and a four-year secondary course. Under the leadership of Superintendent J. M. Greenwood, who inherited the seven-four system when he became superintendent in 1874, the Kansas City system has had a record of proficiency that cannot be excelled by any system in the United States. Dr. Greenwood seriously questioned the system when he became superintendent. He, therefore, subjected it to the most careful study. By 1902, after twenty-eight years of study and of testing results, he expressed himself as unalterably in favor of the seven-four plan. Results had been tested as to the ability of students from the Kansas City High School to pass the regents' examination of the State of New York. Success of students in

various colleges and universities of the country was gratifying and placed the Kansas City schools in the most fovorable light.

A larger proportion of students in the Kansas City schools completed the elementary grades and entered the high school than of any other city of the country. It was also found that a larger percentage of the total school enrollment was found in the high schools of Kansas City than of any other city. Children of the Kansas City school, when tested by questions of corresponding grades in the eight-year systems of Brooklyn and other cities in English grammar, composition, arithmetic, geography, and United States history, were found to be equal or superior to those of other systems. It was further shown that 85 per cent of the pupils completed the course in seven years or less.

On the basis of the experience of Kansas City, in a city of 1,000,000 population a seven-year system costs $1,500,000 a year less and gives 5,000 pupils a year each more of education. Pupils, moreover, who must go to work leave school with a year more of training. It therefore improves society by giving a better trained citizenship.

A second experiment has been conducted in the training school which is connected with the School of Education in the University of Chicago. Here we have an eleven-year system which demonstrates not only that the elementary grades can be satisfactorily done in less than eight years, but also that students can be trained effectively for college in such a system. This experiment shows rather conclusively that technique of instruction is the most important factor in reducing the time required for accomplishing standard results.

No aspect of the general problem of education has been more carefully studied during the first quarter of the present century than has the aspect dealing with economy of time in elementary education. The study has also extended into the high school and college and university. In this movement two men, of national and international reputation, contributed no small share. These men were Dr.

Charles W. Eliot, for many years president of Harvard University, and Superintendent J. N. Greenwood, for many years superintendent of the Kansas City public schools, as referred to above.

As early as 1892, President Eliot advocated the shortening and enriching of the grammar school course, and he continued to advocate this idea in articles, in educational gatherings, and in educational books. Largely through his efforts and those of Superintendent Greenwood, the Committee on Economy of Time in Education was appointed at the National Education Association in 1908. Its findings and recommendations have been of far-reaching importance in shortening and enriching the courses offered in the public schools of this country.

In 1908, the Committee on Economy of Time in Education was appointed by the National Council of Education. Its report was published as Bulletin, 1913, No. 38, of the U. S. Bureau of Education. This committee agreed that graduate and professional studies should begin at the age of 20.

It was the judgment of the entire committee that the elementary school work can be completed in six years. The committee believed that elementary education can be done easily in six years, not by compressing the work now generally offered into that period of time, but by choosing the most important subjects and also by choosing the most important topics within a given subject. The tools of education, or the formal subjects, can in this way be actually covered in six years. The committee called attention to a further reason why this should be done in the fact that at the age of 12, students are just entering upon the period of adolescence and require new and varied interests. Physiological and psychological reasons dictate a break at this period.

The traditional practice of drawing out general education to cover a period of approximately sixteen years has been largely the result of the demands for general culture, in the view of this committee, and since culture content has grown enormously, there has been a tendency to crowd more and

more school work into these years. It was the opinion of the committee that the interests of the child must receive greater consideration; and it was the belief of the committee that content subjects, organized to meet the interests of the child and to prepare him for active participation in life, should begin at about 12 years of age, and that these content subjects should not be taught with methods suitable for formal tool subjects. The committee, therefore, would include the last two years of the present eight-year elementary school in the secondary period, and begin foreign language, algebra, constructive geometry, elementary science, history, and certain so-called vocational or finding courses that would serve as an introduction to life activities.

In both the elementary and secondary grades, the committee believed that economy of time could be effected through selection, elimination of non-essentials, vitalized methods, and the relating of school work to the interests and needs of modern life. Such a course, they believed, would provide for real results in the education of the youth of this land. In the secondary period, where six years are included, the committee recommended that the period be divided into two parts, two years being used for transition from the elementary school to the senior high school and four years being used for the high school and junior college work, leaving only two years to be completed before the student is ready for his graduate or professional work. If high schools are not to be organized so as to prepare the student for the junior year in college, then the high-school period should be finished by 16 and the college period of four years should begin at that time.

With reference to the feasibility of doing the elementary work in a shorter period than eight years, Dr. Charles H. Judd, in an article in the *High School Quarterly,* dated July, 1914, says:

> Every indication would seem to point to the conclusion that seven years are more than adequate for the elementary training, in the proper sense of the term.

Dean W. F. Russell in the *High School Quarterly* of 1915 said:

> If we wish to prepare for entrance to college, five high-school years beyond six elementary years should be sufficient.

Superintendent I. I. Cammack, of the Kansas City schools, successor to Dr. Greenwood, has this to say:

> Instead of giving up this plan (the seven-four plan), we are more than satisfied with the results we are getting. It is the greatest real economy in education ever offered to the American people.

A little calculation will show that the eleven-year system, with students enrolling at 6, would run the high-school period to 17, the junior college period to 19, and the senior college period to 21, which is one year more than is necessary to prepare for graduate and professional work, according to the committee whose report is under consideration; and a twelve-year period would put the student two years beyond the period which this committee thinks is desirable for the beginning of graduate and professional courses.

In view of these facts, it would seem that the eleven-year school is more nearly in line with the results of studies thus far made than is the twelve-year system. Any change that is made looking toward the extension of time of elementary and secondary education in schools having eleven years should be scrutinized most carefully and should be based on incontrovertible evidence of its desirability.

School men of Texas are striving strenuously, and with success, to raise the standard of teachers in the public schools. They are engaged in curricula studies and improvement. They are striving to discover the best technique of instruction. They are anxious to avoid, if possible, any innovation that would increase unnecessarily the burden of school support. On the other hand, Texas is interested in securing the best in education for the children of the State. She is interested in her real educational status.

Students of education in Texas are not wedded to any particular organization. The burden of proof, however,

rests with those who would bring about innovations. It was thought that the basis for holding fast to that which is good and of making changes where conditions demand them, should be a study of facts. It was for the purpose of making a beginning in this direction that the study here presented was undertaken by the Bureau of School Inquiry. Dr. H. T. Manuel, whose interest in educational organization, and especially the relation of tests and measurements to organization, has given him wide training and experience, undertook to carry out the plan of study and to tabulate and interpret the data.

The writer desires to express his appreciation to all those who so generously coöperated in the enterprise, a partial list of whom will be found on the early pages of Chapter IV.

It is believed that this bulletin, while only a beginning, presents data and suggestions of value to school men in dealing with the problems of educational organization. It is hoped that it will stimulate interest in the problem and point the way to other studies of a similar sort. It is through studies such as this that we shall be able to gather a body of data by means of which evaluation of school work may be had and suggestions for improvement made.

CHAPTER I

PROBLEM

Into what administrative units should the provisions for public education be divided? How many years should be devoted to each? Should Texas retain the present eleven-year system of elementary and secondary schools or turn to one of twelve years, the number found in most of the states?

It is certain that the twelve-year system conforms to general practice.[1] And it may be supposed that it is favored by general opinion also.

In sharp contrast with this, more than twenty years ago the then State Superintendent Arthur Lefevre[2] wrote a recommendation for the "general adoption of the standard of six years work for the elementary schools and four years for the high schools." Earlier in the report he had boldly stated:

> All that has been attempted in the prevailing twelve (or eleven) years course of study can be better accomplished by the same teaching force in ten years. (There may be one or two high schools in the State whose course of study has been extended beyond the regular American standard.) The twelve-year plan did not develop from experienced needs, but was foisted upon our American school system by would-be imitators of the German system who did not understand it, because that system accomplished in nine years all that its imitators tried to spread over twelve.

Texas did not follow Superintendent Lefevre to the extent of reducing the schools to a ten-year basis, but eleven-year systems did come to be almost universal in the State. Was

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[1]See more detailed statement in Chapter II.

[2]Fourteenth Biennial Report of the State Superintendent (Texas) 1904 (date of publication, 1905), pp. 11 and 15.

this a mistake? Should Texas begin to turn toward the eight-year elementary school? Or is it barely possible that the accidents of history have in this case favored the State with a plan distinctly superior to the prevailing one?

At the outset, it must be clearly understood that a full answer to these questions can not be given in this monograph. Important data are still lacking. It is hoped that enough may be said, however, to indicate the importance of the problem, to define it more clearly, and to suggest a profitable direction for further investigation. It is certain that a scientific answer can not be rendered by those who would make of the inquiry simply an attempt to justify one administrative practice or the other. Rather, we must assume the rôle of seekers for truth, let the outcome be what it may.

For convenience, the subsequent material of this report will be presented under five heads—namely,

(1) Historical Aspects of the Problem.
(2) Related Studies.
(3) A Coöperative Study of Achievement.
(4) Recommendations.
(5) Further Research.

CHAPTER II

HISTORICAL ASPECTS OF THE PROBLEM

Traditionally, there have been in the United States three general divisions in the system of public education—elementary, secondary, and higher. It has been the function of the first to instruct in the fundamental skills and in certain common elements of culture. Higher education has been devoted to extending the culture of the few, to furthering research, and to preparing for the professions. Secondary schools have had the dual task of extending educational opportunities beyond the fundamental skills and culture of the elementary schools and of preparing for college and university.

The administrative arrangements for these divisions of public education have had different origins and have developed with only a limited consideration of articulation with one another. Our problem would have been vastly different if we had first developed a continuous series of grades reaching from the beginning of school instruction to the completion of a professional course, and had then set about to divide this unified series into convenient administrative units. As it is, however, we have had the problem of welding into a continuous whole three or four types of schools that have developed in partial independence of each other.

Gradual Rise of the Prevailing Organization

The arrangement of schools definitely into grades corresponding to years of advancement is an accomplishment in a large measure of the nineteenth century. In the elementary schools, in particular, there was relatively little class instruction before 1800.[1] In the last hundred years we have progressed gradually toward a standardization of the number of years covered by each of the divisions of

[1] *Cf.* Parker, S. C., The History of Modern Elementary Education, pp. 95ff.

public education. During this time various plans have been tried in different places and often in the same place. The situation even now is not at all uniform. In 1911, of 669 cities listed as having a population of 8,000 or over, 489 (73%) had eight years of elementary school and four of secondary; 86 (13%) had nine and four respectively; 48 (7%) had seven and four, respectively; the remaining systems had various other plans.[2] In recent years, the junior high school and the junior college have complicated the picture still more. Except for variations of this kind, however, the prevailing system of public education at the present time is as follows:

School	Grades	Ages
Elementary	1- 8	6-14
High School[3]	9-12	14-18
College	13-16	18-22
University (professional and graduate)	17-19 or 20	22-25 or 26

Various influences tended to crystallize the plan of public education with the nineteen or twenty grades above outlined. These influences need not be discussed here except to point out the alleged effect of the Prussian school system upon the length of the elementary schools,[4] and the interposition of the "English" college between the secondary school and the "German" university.[5]

The Traditional Organization Questioned

In two related movements the traditional organization of public education has been seriously questioned. The

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[2]U. S. Bureau of Education, *Reorganization of the Public School System.* Bulletin 8, 1916. By Frank Forest Bunker.

[3]"About one secondary school in every six is organized according to the six-year plan." U. S. Bureau of Education, J. J. Tigert, Commissioner. *Education in the United States of America,* 1927, p. 37.

[4]*Cf.* Bunker's discussion in Bulletin 8.

[5]U. S. Bureau of Education. *Report of the Committee of the National Council of Education on Economy of Time in Education.* James H. Baker, Chairman. Bulletin, 1913, No. 38, p. 10.

first arose from a demand for economy of time and the second from a demand for a reorganization looking toward a better articulation of the several administrative units.

As early as 1888 at the Washington meeting of the Department of Superintendence of the National Education Association, President Eliot made an address, "Can School Programmes Be Shortened and Enriched?" In this he called attention to the late age at which, under the existing school organization, persons enter upon their professions, and "maintained the desirability of condensing school courses to gain time."[6] In 1913 the *Report of the Committee on Economy of Time in Education* was published. This presented a provisional time scheme in which two years were to be saved in general education as follows:[7]

Elementary education	6-12
Secondary education (2 divisions—four years and two years)	12–18
College	18–20 or 16–20
University (graduate and professional schools)	20–24

As the discussion continued, there seemed to be a disposition to shift the emphasis from a saving of time to a reorganization of administrative units, curricula, and methods. The eight-four organization of elementary and secondary schools, in particular, aroused serious criticism—not because of the length primarily, but because of the division of subject matter, the administrative arrangements, and the like. The widespread organization of junior high schools has been one phase of this movement. It should be observed that, while there is a growing disposition to refer to the first six years as the period of elementary education, a reduction in the total time of elementary and secondary education is not implied. College education is still generally based upon the completion of twelve years' previous schooling. The total length of the period of public education has not been reduced on the elementary and secondary level.

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[6]U. S. Bureau Bulletin 8, p. 43.

[7]*Op. cit.*, p. 10.

The Seven-Four Organization

While twelve years are generally recognized as the period of elementary and secondary education, there are notable exceptions. For more than fifty years (since 1867) the elementary schools of Kansas City,[8] Mo., have been organized on a seven-year basis, and this organization is found in several states of the South. According to Ives, Alabama, North Carolina, South Carolina, Louisiana, Texas, and Virginia had the seven-four plan of organization in 1923, while Georgia, and Tennessee had mixed systems.[9]

A satisfactory history of the seven-year elementary school in Texas is yet to be written. Bunker's explanation[10] of the adoption of the seven-year system in the South is probably too simple a statement of the case:

> Among the Southern States, the typical elementary course is one of seven years, probably adopted because of the poverty of the people and their inability to make further provision for school work when their school systems were established.

At all events, various plans have been tried in Texas. The seven-year system became almost universal only after a considerable period in which practices were not at all uniform.

Development of the Seven-Four Plan in Texas

The following examples and statements suggest differences in practice in the latter part of the last century and a gradual development of the now prevailing seven-four plan.

In 1875 the first municipal high school was established at Brenham. At that time the city schools consisted of

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[8]U. S. Bureau of Education, Bulletin No. 8, 1916, p. 60.

[9]Ives, C. A. *A Comparison of the 7–4 and 8–4 Plans of School Organization in Certain Schools of Arkansas, Mississippi, and Louisiana.* State Dept. of Education, Louisiana, 1923, p. 5. The writer is indebted to Prof. A. W. Evans for access to this bulletin.

[10]Bunker, F. F. *Op. cit.*, p. 75.

three general divisions of three grades each—namely, the primary schools, the grammar schools, and the high school.[11]

High schools sometimes arose independently and sometimes grew out of the elementary schools.

> Only in a few instances were the high schools launched as independent units of organizations as in Brenham and Houston. In other cases they burgeoned by a more natural process of growth out of the lower grades as an extension upward of the elementary course of study.[12]
>
> In 1885, Galveston had ten grades, but all the work was elementary in character. By 1888 there were eleven grades, and the ninth, tenth, and eleventh were designated the high school. In 1887 Dallas had ten grades, and the eighth, ninth, and tenth formed the high school.[13]
>
> By 1882–83 the Houston [high] school maintained two four-year courses, the classical and the general, the latter including French and German.[14]

Early References in the Texas School Journal

In October, 1883, the *Texas School Journal*[15] quoted without comment an article from the *National Normal* in which a plan was given for organizing a school program covering eight years. The following statements occur in the course of the article, p. 208:

> He [the country teacher] will see that, whereas, in a fully graded school, twelve grades corresponding to as many years can easily be provided for, in a country school of one room and one teacher, about eight years only can be accomplished. In

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[11]Eby, Frederick. *The Development of Education in Texas.* Macmillan Company, New York, 1925, pp. 243–244.

[12]*Ibid.*, p. 245.

[13]*Ibid.*, p. 246.

[14]*Ibid.*, p. 252.

[15]*Texas School Journal*, Vol. I, No. 10, pp. 208–210.

The writer is indebted to State Superintendent S. M. N. Marrs for kindly placing the early files of this Journal at his disposal.

> other words, a country school, either of one or two rooms, should not attempt more than the primary or grammar work.

In June, 1884, the same journal printed an article by W. J. Crocker on "A Course of Study for Country Schools." Work for eight grades was outlined. The eighth year included reading, literature, spelling, elementary geometry, elementary algebra, familiar science, rhetoric, physical geography, general history, physiology, and writing or bookkeeping. While the course contained some subjects now recognized as high-school subjects, the author claimed that "what is needed is a course of study that will be complete in itself, and at the same time be preparatory to the high-school course."[16]

The August, 1886, number of the Journal contained the eighth-grade questions for admission to the San Antonio High School. The subjects were U. S. history, civil government, physical geography, grammar, and arithmetic.[17]

A writer in the September, 1887, number of the Journal defined a high school as follows:

> By a high school we understand that distinct department of public education in which four years of study beyond the grammar school is pursued, with higher mathematics, science and literature, for the purpose of rounding and completing the work of the public schools, or preparing the student for admission to the university.

That he expected the high school to follow a seven-year elementary course is evident from his question:

> Have seven systematic years of work, closing with the grammar school, sufficiently prepared the pupil for the demands that society is sure to make upon him?[18]

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[16]*Ibid.*, II: 162.
[17]*Ibid.*, IV: 249–250.
[18]*Ibid.*, V: 281.

As late as 1892, however, we find in the Journal a proposal for a course of study covering eight years "for a five months school." After the eighth grade a certificate of graduation was to be issued. This course appears to have been adopted for trial in Limestone County at a meeting of the County Educational Association.[19]

Evidence from Reports of State Superintendent

Variations in practice at different times are suggested also by the Biennial Reports of the Superintendent of Public Instruction of the State of Texas. In 1888 the report advocated a classification of schools into primary schools, intermediate schools, and high schools. The high-school course was to be limited to three years. The same report carries a statement of the organization of the Austin (p. 282) and the Cleburne (p. 286) schools. These were divided into three departments or schools—namely, four primary grades, four grammar grades, and three high-school grades.

The Seventh Biennial Report, 1890, outlines a course of study with divisions as follows (pp. XLIV-XLVI):

Primary division—first to fourth years.

Grammar divisions—fifth and sixth years.

Graduation division—seventh and eighth years.

In the last division the subjects were largely those of the ordinary elementary school: spelling, reading, writing, arithmetic, geography, grammar, history and physiology, elementary science, and the U. S. system of land survey.

The Eleventh Biennial Report, 1898, contained a course of study for rural schools (pp. 259ff.). This course was organized for three departments:

Primary departments—grades 1–3.

Intermediate department—grades 4–6.

Advanced department—grades 7–8.

An examination of the subjects recommended for the eighth grade shows that they may be classed as elementary.

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[19] *Ibid.*, X: 449–450.

The Fourteenth Biennial Report (published 1905) gives clear evidence of the lack of standardization of the length of time devoted to elementary and high schools as late as 1904, the year when the report was prepared. (An extract from this report was quoted in the preceding chapter.)

The Eighteenth Biennial Report, eight years later, bears evidence that by this time (1912) the present seven-four organization was regarded as standard. On p. 41 it is stated that "a high school of the first class is required to offer instruction covering four years or grades in advance of the seventh year or grade, preferably including the eighth, ninth, tenth, and eleventh years or grades."

Apparently, the seven-four organization of schools in Texas has not been greatly disturbed by the junior high-school movement. According to the Texas Educational Survey, "Texas has been distinctly less enthusiastic about this movement than have many of the other states."[20] The following reasons are assigned for this lack of enthusiasm for the junior high school:

1. The elementary schools have only seven years.
2. The uniform prescription of textbooks has resulted in an inflexibility in the State system.
3. "Many of the school people do not believe in it. They think it inappropriate to small towns and they think of it as expensive."

SUMMARY

Serious problems of articulation and of economy of time in elementary and secondary education have arisen in the country at large. They have resulted in part from the different origin and partially independent growth of these branches of the public school system.

Twelve years (the eight-four plan except as modified by such movements as the junior high school) have generally

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[20]Texas Educational Survey Commission. *Texas Educational Survey Report.* Vol. III. *Secondary Education* by C. H. Judd, 1924, p. 12.

come to be recognized as the period of elementary and secondary education in most of the states.

In Texas a seven-four organization was evolved after trial of various plans. This organization in 1924 was still relatively little disturbed by the junior high-school movement. The seven-four plan prevails also in a few other states of the South.

CHAPTER III

RELATED STUDIES[1]

It is not easy to evaluate the relative merits of eleven-year and twelve-year periods of elementary and secondary education. There are many variables besides that of length. The rival claims of supporters of the two systems have not always carried conviction. Frequently their statements have been based upon insecure evidence. Often, too, their arguments have neglected pertinent considerations. There have been some studies, however, that may be regarded as substantial contributions to a solution of the problem.

While the *Report of the Committee on Economy of Time in Education*[2] (1913) does not advocate a reduction of the combined time devoted to elementary and secondary education, the report has a direct bearing upon the question at issue. It furnishes a helpful statement of the educational principles involved in a reduction of the total time given to general education and summarizes the opinions of a number of educators. The committee agreed that "there is much waste in elementary education, and that the elementary period should be from 6 to 12." The report recommended a six-year period for the high school also.

The Kansas City Organization Evaluated

The schools of Kansas City, Mo., are of particular interest because of the long time during which they have been organized on the seven-four plan and because of their location in a section of the country in which the twelve-year period is common. Various reports on the Kansas City

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[1]The writer is indebted to Miss Pauline Shirley for assistance in preparation of this chapter. No attempt is made to include all the references bearing on the subject.

[2]*Op. cit.*

system may be found in the literature.[3] Reference to one of these, an article by Assistant Superintendent George Melcher, will suffice.[4] In this a strong case is made for the seven-year system. He says in part:

> In Kansas City, hundreds of thousands of standard tests have been given to the pupils in the elementary schools; it has been the policy for ten years to check the seventh grade pupils in Kansas City against the eighth grade pupils in other cities, and the sixth grade in Kansas City against the seventh grade in other systems. In this comparison, we have found that scores of the seventh grade pupils in Kansas City on school achievement tests rank above the median scores in other cities. In most cases our schools rank in the upper quartile of the cities of the United States; very rarely on any test do we fall below the median of other cities. Furthermore, the graduates of the Kansas City elementary schools enter high schools in any city and do satisfactory work; the graduates of our high schools, based on a seven-year elementary course, do superior work in the standard colleges and universities of the country.

The following advantages are claimed:

> 1. A larger per cent of pupils continue their course into high school and college. More than 80 per cent of all the pupils graduate from the elementary school course in Kansas City. More than 30 per cent of all pupils who enter the elementary grades continue until they graduate from high school.
> 2. The seven-year system raises the educational level of the average pupil at least one year.

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[3]See for example: Greenwood, James M., "Shorter Time in Elementary School Work." *Educational Review*, 24:375–390, Nov., 1902. Greenwood, James M., "Seven-Year Course of Study for Ward-School Pupils. "*N.E.A., Addresses and Proceedings*, 1903, 249–260. Greenwood, James M., "A Seven-Year Course for Elementary Schools and a Five-Year Course for Secondary Schools. "*N.E.A., Addresses and Proceedings*, 1907, 290–294. Melcher, George, "Eight-Year Course Means Clear Loss of Year." *School Life*, 9:220, May, 1924.

[4]*Op. cit.*, p. 220.

> It also raises the educational level of the community one to two years. Fifty per cent of all the pupils who enter the elementary schools in Kansas City are now completing the tenth grade, but most cities have lost 50 per cent by the end of the eighth grade.

IVES' STUDY

In 1923 the Louisiana Department of Education issued a pamphlet by C. A. Ives making certain comparisons of the seven-four and the eight-four plans.[5] Reference has been made to this study in an earlier chapter. According to Mr. Ives one may not assume that the two plans have equal merit. In view of the claims of superiority of the eight-year systems, he raises the following questions:

> But what are the facts? Is it true, as some claim, that the grading and classification of students in the seven-year elementary school is more rigid than in the eight-year elementary school, and that as a consequence, the time theoretically saved is not saved? Is it true that students from an eight-year elementary school achieve better results in high school than those from seven-year schools? And how do the respective groups compare in their college records?

The author "sought to set forth pertinent data bearing on the relative efficiency and economy of time of the two systems, and furnish at least approximate answers to such questions as those just suggested."

The part of the report which is of interest here is that dealing with a statistical comparison of three eight-four schools (two in Mississippi and one in Arkansas) and three seven-four schools (in Louisiana). The author recognizes the limitations of his data on account of the small number of schools, but his appeal to statistics in attacking the

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[5]Ives, C. A., *A Comparison of the 7–4 and 8–4 Plans of School Organization in Certain Schools of Arkansas, Mississippi, and Louisiana.*

problem must be regarded as a significant advance over *a priori* argument.

In the first place, eight standard educational tests were given in the several high schools to find out how "the achievements of students from eight-year and seven-year elementary schools compare on the high-school level." The statistical treatment of the test results is not all that might be desired. (To get a general average for all subjects, he reduced the medians to per cents of the standards.) By his method of comparison, however, he found the seven-four schools somewhat superior on the average, though an eight-four school had the highest score of the several schools.

Using these same schools, he found the median age of students for the two groups as follows:

Year of High School	8-4 Schools Yrs.—Mos.		7-4 Schools Yrs.—Mos.		Difference Mos.
1	14	8.8	14	0	8.8
2	15	9.0	15	1	8.0
3	16	7.0	16	0	7.0
4	17	5.0	16	10	7.0

In these schools, therefore, the seven-four high-school students were, grade for grade, from 7 to 8.8 months younger than the eight-four students.

A third comparison was made of the high-school enrollment in relation to the total enrollment. For the three eight-four schools he found only 18.8 per cent of the total enrollment in the high schools as compared with 29.1 per cent for the seven-four schools. These figures must not be taken at their face value, however, as representing the holding power of the two organizations, for with perfect retention in both types of schools the per cent to be found in the last four years of an eleven-year system would be greater than that found in the last four years of a twelve-year system.

Two Comparisons on the College Level

Two recent studies have contrasted the achievements of eight-four and seven-four students on the college level.[6] The first of these was based upon high-school grades and first-year grades of certain freshmen in the University of Chicago. The grades of students who came from states having seven-four systems were compared with those of students who came from similarly situated states having eight-four systems.

One comparison of the two groups was based upon their relative homogeneity. In this the average high-school grades of 87 seven-four students were compared with the average high-school grades of 177 eight-four students. (Before the comparison, an effort was made to express all grades in equivalent figures with reference to the same passing mark.) The tabulation shows that, while the medians of the two groups were almost the same (86.5 and 86.8, respectively), the seven-four group was slightly *less homogeneous* than the other (semi-interquartile ranges of 4.4 and 3.7, respectively). This means, of course, that in the particular groups compared, the average high-school grades of the seven-four students were a little more variable than those of the eight-four students. It is doubtful, however, whether the difference is great enough and the number of cases large enough to be especially significant.

Another comparison was that of the extent to which the several students in each group tended to retain the same rank as college freshmen as that in which their high-school grades placed them. The students in each group (85 seven-four and 176 eight-four) were ranked from 1 to 5 according to their average marks in high school, and a similar ranking was made on the basis of their college marks. In some

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[6]Light, Edith, *The Seven- Versus the Eight-Year Elementary School as a Basis for Preparation for College.* Master's Thesis, University of Chicago, 1926.

Roemer, J., "The Report of the Committee on Deans' Reports." *Association of Colleges and Secondary Schools of the Southern States,* 1926, pp. 207ff.

cases the college ranks agreed with the high-school ranks, but in others the pupils achieved a higher rank or fell to a lower one. The seven-four pupils were shown to be somewhat more consistent in retaining as college freshmen the same rank as that in which their high-school grades placed them. But here again the difference is small.

A third comparison was made on the basis of the average number of grade points made by these students in the University. Grade points range from —3 to 6. An average of at least two points is required for graduation. The median grade points were as follows:

	English	General Average
Eight-four Students	2.97	2.4
Seven-four Students	2.93	2.5

It will be observed that the averages are practically the same. Again, about the same percentage of students were found "below credit" in one group as in the other, but a slightly larger percentage of eight-four than of seven-four students were below passing.

The author concludes that "the high school based on the seven-year elementary school system tends to send as successful a group of students to the University of Chicago on the whole as does the high school based on the eight-year elementary school."

The 1926 *Report of the Association of Colleges and Secondary Schools of the Southern States* carries significant statistics on the failures of college freshmen in their first quarter or semester.

A comparison is made of the percentage of courses failed by students from high schools based upon a seven-year and upon an eight-year elementary school.[7] The figures are as follows:

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[7] *Op. cit.*, p. 278.

Year	Percentage of Courses Failed	
	By students from 7-year Elementary Systems	By students from 8-year Elementary Systems
1921–22	12.8	12.2
1922–23	12.5	9.8
1923–24	13.2	11.4
1924–25	14.3	13.5

While the students from the high schools based upon seven-year elementary schools have in each of the four years for which figures are available a higher percentage of course-failures, the difference is slight, ranging from .6 of 1 per cent to 2.7 per cent with an average difference of only 1.5 per cent. The ages of the students are not given.

Studies of Conditions in Texas Schools

Volume IV of the Texas Educational Survey Report deals with "Educational Achievement."[8] Tests of achievement and of mental ability were given to "only a small portion of the whole pupil population," but an attempt was made to get a sampling that would be fairly representative of the school groups which were to be studied. Rural communities rather than urban were favored in choosing the places where tests were given. The report includes some results for each of the grades from 3 to 11, inclusive, but attention was centered especially on grades 5 and 7. Furthermore, in both achievement and ability tests, the report emphasizes "not comparison with norms outside of Texas, but rather comparisons . . . of pupils of given grades in the schools of different size within the State of Texas."

The utility of these results for our present purpose is limited. The comparison of small rural, large rural, and city schools showed that both in tests of achievement and in tests of mental ability, the pupils in the city schools made the best averages and the pupils in the small rural schools the poorest. In evaluating the seven-four system, it will probably be the best procedure to limit our attention to the

[8]Texas Educational Survey Commission. *Texas Educational Survey Report*, 1925. George A. Works, Director of Survey.

larger schools. In that way we shall probably be using results from systems more nearly comparable to those from which data for the general norms were obtained, and shall avoid to a certain extent the operation of factors tending toward low results in any organization.

In the table below, therefore, only results from city schools, defined in the survey report as those having more than ten high-school teachers, will be presented. The separate tabulation of the Arithmetical Reasoning sub-tests of the National Intelligence Test, the Gregory-Spencer Geography results in the tenth grade, and the Hotz Algebra scores beyond the eighth grade are omitted for lack of satisfactory comparative norms.

TABLE I

Texas Survey Results for City Schools in Comparison with Norms for Eight-Year Schools

A. Median Chronological Ages, Mental Ages, and Reading Ages.

	(1) Chronological Age of Pupils Taking N.I.T.		(2) Mental Age National Int., A		(3) Reading Age Thorndike-McCall	
	No.	C.A.	No.	M.A.	No.	R.A.
Grade 5	1051	11.8	1027	11.7	896	11.7
Grade 7	1094	13.7	1085	14.0	938	14.2
	Of Pupils Taking Miller Test		Miller M.A.		Thorndike-McCall	
Grade 8	337	14.8	330	15.1	337	14.5
Grade 9	265	15.8	256	16.8	262	15.4
Grade 10	257	16.4	253	17.6	213	16.3
Grade 11	257	17.5	252	19.5	256	17.2

(1) Chronological ages secured from information on intelligence test blanks. See Tables 36, 38, 39, 40, 41, and 42 of *Survey Report.*

(2) Mental ages in grades 5 and 7 based upon National Intelligence Test, Scale A; in grades 8–11 upon Miller Mental Ability Test. See Tables 66, 68, 69, 70, 71, and 72 of *Survey Report.*

(3) Reading ages based upon Thorndike-McCall Scale. Numbers tested and median T scores from Tables 45, 47, 48, 49, 50, and 51 of *Survey Report.* Age equivalents calculated from *Directions for Using Thorndike-McCall Reading Scale.*

B. Grade Scores in Thorndike-McCall Reading Compared with Eight-Year Norms.

	(1) Grade Reached in 7-Year System	(2) Norm in Terms of 12-Year System	(3) Grade Score Attained
Grade 5	5.5	5.9	5.8
Grade 7	7.5	8.1	7.8
Grade 8	8.5	9.2	8.2
Grade 9	9.5	10.3	10.3
Grade 10	10.5	11.4	12.4
Grade 11	11.5	12.5	13.8 (Estimated)

(1) Grade reached in middle of year.

(2) Norm is expressed in terms of corresponding grade level in twelve-year system to be reached at middle of year, on the assumption that pupils in an eleven-year system should accomplish in eleven years what others accomplish in twelve.

(3) Score in reading, expressed in terms of grade norms. Calculated from median T scores by reference to *Directions for Using Thorndike-McCall Reading Scale.*

Thus, in the middle of the year, normal progress is represented by the numbers 5.5, 7.5, 8.5, and so on to 11.5 in the eleventh grade. But if the pupils are to cover the twelve-year standards in eleven years, each year must represent one and one-eleventh years' progress. The theoretical standards then are 5.9, 8.1 and so on to 12.5. The actual attainments in terms of an eight-grade system as represented in the last column.

C. Woody Arithmetic Test—Addition and Division Scores.

	Addition			Division		
	No. of Pupils	Scores No. of correct examples	Author's Norms (1)	No. of Pupils	Scores No. of correct examples	Author's Norms (1)
Grade 5	1046	13.5	13.7	1046	8.7	8.4
Grade 7	1091	15.6	16.4	1089	11.3	11.9

(1) Norms are for middle of the year in schools having eight years. See Table 9 of *Survey Report* for all of above data.

D. Morrison-McCall Spelling Test. Number of Correct Words.

	No. of Pupils	Median Scores	Norms
Grade 5	1031	31.8	33.0
Grade 7	1090	42.1	41.0

(See Table 12 of *Survey Report* for all of above data.)

E. Hotz Algebra, Grade VIII.

Addition and Subtraction			Equation and Formula		
No. of Pupils	Median Score	Norm (1)	No. of Pupils	Median Score	Norm (1)
195	4.2	5.0	189	3.9	4.9

(1) Norm for pupils at end of three months. See Table 14 of *Survey Report* for all of above data.

In summary of the above table, it may be said that—

(1) The first-year high school pupils who were tested had a median score distinctly below the Hotz three-month norm. These pupils did not come up to the standard of performance expected of pupils who have had eight years of elementary school below the high school. The number of pupils tested is so small, however, that the results are highly unreliable.

(2) In spelling, the pupils of the fifth grade are slightly below, and the pupils of the seventh grade are slightly above, the norms for grades of the same number in the eight-year systems. In the seventh grade the standing is equal to that achieved by average pupils in the eighth grade of "rural and village schools" conducted with eight years of elementary school. (See p. 3 of *Morrison-McCall Spelling Scale.)*

(3) Except in one case (fifth-grade division), the median scores in arithmetic are a little below the norms for grades bearing the same number in eight-year systems.

(4) In reading, the pupils are above the norm for the corresponding grade of an eight-grade system in all grades except the eighth. The achievement in the tenth grade is almost that expected of high-school seniors; in the eleventh grade it is much higher. A comparison of median reading ages, however, with the chronological ages of the pupils shows that in general their achievement is slightly less than is expected of pupils of the several ages.[9]

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[9]Reference to A of the preceding table shows that the number of pupils on whom chronological age is based is sometimes quite different from that on which reading age is based. Consequently, these comparisons must be made with reservation.

(5) The mental age is almost the same as the chronological age in grade five, but in the higher grades it is greater—in the last years of the high school markedly so.

The results of the Texas Educational Survey, then, leave us in doubt. They suggest a close relation between maturity as measured by age and standing in educational tests. They lead us to expect that at the time of leaving the elementary grades the seven-year pupil in the better schools of Texas will have an achievement a little below, but in some subjects at least not a full year below, the eight-year pupil of the North. The results in reading, however, raise the interesting question as to whether this handicap will not be entirely overcome by the time of high-school graduation. It must be remembered, of course, that we are dealing with averages that are subject to the influences of selection.

Port Arthur Survey

The *Report of the Survey of the Schools of Port Arthur, Texas,*[10] presents results that bear on the efficiency of seven-year systems in comparison with eight-year systems. In it the staff raised the question directly on the basis of an extensive testing program. The summary presented in Table 43 (p. 165) is as follows:

GRADE SCORES OF PORT ARTHUR SCHOOLS IN INTELLIGENCE, READING, FUNDAMENTALS IN ARITHMETIC, SPELLING, NATURE STUDY AND SCIENCE, HISTORY AND LITERATURE, AND LANGUAGE USAGE

EIGHT-YEAR ELEMENTARY SCHOOL STANDARDS

	Median Grade Scores							
	4L	4H	5L	5H	6L	6H	7L	7H
Standard for the Grade	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9
Intelligence	4.1	4.3	4.7	5.3	5.5	6.3	6.7	6.5
Reading	4.5	4.9	5.2	5.9	6.3	6.0	7.1	6.6
Fundamentals in Arithmetic	4.6	5.2	4.8	5.0	5.7	5.8	5.9	6.6
Spelling	4.1	4.4	4.8	5.1	5.7	6.2	6.7	7.7
Nature Study and Science	----	----	4.8	----	----	----	6.7	----
History and Literature	----	----	4.8	----	----	----	7.0	----
Language Usage	----	----	5.1	----	----	----	7.1	----

All standings on this table are expressed as Grade Scores. A class having a grade score of 5.2 has a standing equal to an average class in the second month of the fifth grade.

[10]Bureau of Publications, Teachers College, Columbia University, New York, 1926.

In the above table the scores made in the several tests have been expressed in terms of the eight-year elementary grade for which they are normal. The reader should observe that eight-year systems have an additional year not represented in the table, for which corresponding standards would be 8.4 and 8.9, respectively. From the table it is clear that, according to the tests, these pupils at the end of their seven-year elementary school course are not only far below the point reached by other students in eight years, but even below the average expected of pupils in eight-year-system grades of the same number. It should be observed, too, that the condition gets worse with the advance in grade; the fourth-grade pupils are near the standard (above, indeed, in reading and arithmetic), but the seventh-grade pupils are considerably below.[11] This, however, was not found to be the general situation in seven-year systems by such results as we have quoted from the Texas Educational Survey.

Achievement in Beaumont

Through the courtesy of Superintendent M. E. Moore of the Beaumont Schools (one of the systems coöperating in a study to be reported in the next chapter), we are able to give valuable data based upon an extensive study of the achievement of pupils in these schools.[12] All white children, except about "900 six- and seven-year-olds who had not been in school long enough to take the test" and a few who were absent from school, were included in the testing. The Stanford Achievement Test, Form A, was used. The test was given in the fall of 1926. Table I of the *Quarterly Report of the Superintendent to the Board of Education for*

[11]The authors of the survey report give another summary table in in which standards for completing an elementary course in seven years are used. The showing in that, of course, is much worse grade by grade.

[12]Miss Clara Mallory, Supervisor of Tests and Measurements, reported some of the data at the Dallas meeting of the Educational Research Association, 1927.

the Second Quarter, 1926–1927, furnished the data upon which the following table is based.

TABLE II

AGE SCORES IN STANFORD ACHIEVEMENT TEST BEAUMONT SCHOOLS, AGES 7–17

No. of Pupils	Actual Age	Age Standard Reached
175	7.5	8.2 (2)
322	8.5	9.1 (2)
356	9.5	9.8 (3)
379	10.5	10.8
381	11.5	11.7
407	12.5	12.1
405	13.5	13.3
364	14.5	13.5
311	15.5	(14.7) 14.9
230	16.5	(15.3) 16.6
139	17.5	(15.6) Adult

(1) Educational ages from 14–8 up are extrapolated values in the table of norms found in the *Manual of Directions* for the test. The higher figures in the "age standards reached" (last column above) for "actual ages" 15.5–17.5 are "chronological ages." See *Manual of Directions.*

(2) Primary Examination.

(3) Advanced Examination.

The report does not give a distribution of scores by grades.

The striking thing about this showing is the superiority of Beaumont pupils at the early ages and the inferiority at the later ages, particularly ages 14 and 15. This is shown graphically for ages 8 to 14 in Figure 1.

TEXAS PUPILS IN "NATION-WIDE SURVEYS"

Additional evidence on the relative achievement of Texas pupils has been gathered from the reports of the Nation-Wide Testing Survey of Public Schools conducted by the Public School Publishing Company, of Bloomington, Ill. The data are given in Tables III and IV.

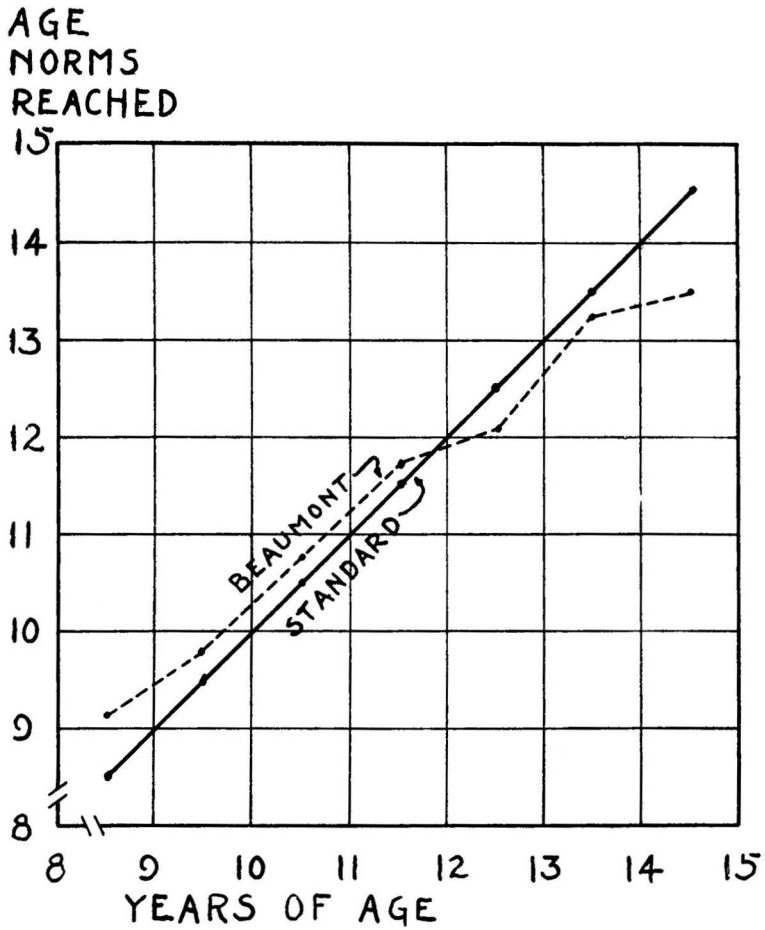

Figure 1.—Age Norms Reached by Beaumont Pupils, Ages 8 to 14, Inclusive.

Note that the lines cross, indicating a performance higher than the standard in the earlier years and lower in the later. Is it possible that with a better organization and method the early superiority would be maintained?

TABLE III

MEDIAN ACHIEVEMENT OF TEXAS PUPILS IN FIRST NATION-WIDE TESTING SURVEY OF PUBLIC SCHOOL PUBLISHING COMPANY, 1924–25

PRESSEY DIAGNOSTIC TESTS IN ENGLISH COMPOSITION
(Texas, 1974 Pupils)

Grades	Capitalization		Punctuation		Grammar		Sentence Structure	
	Nation	Texas	Nation	Texas	Nation	Texas	Nation	Texas
12	23.8		20.2		22.7		19.5	
11	23.3	22.9	19.1	19.2	21.2	20.7	18.6	18.8
10	22.8	22.0	17.3	16.9	19.0	18.0	17.2	17.4
9	21.5	20.8	14.0	15.3	16.5	17.0	15.1	15.0
8	20.6	20.0	12.4	13.2	14.6	14.2	13.6	14.0
7	18.8	18.5	10.4	10.4	12.0	12.6	11.8	11.6
6		17.6						

Figures have been compiled from *Report of the Nation-Wide Survey of Pupils' Achievements in English Composition.* Public School Publishing Company.

TABLE IV

MEDIAN ACHIEVEMENT OF TEXAS PUPILS IN SECOND ANNUAL NATION-WIDE TESTING SURVEY OF PUBLIC SCHOOL PUBLISHING COMPANY, 1925–26

Grades	Problem Solving (Stevenson Arithmetic Reading Tests) (Texas, 1199 Pupils)				English (New York English Survey Tests in Language Usage)					
					Language Usage (Texas, 1025 Pupils)				Grammar (Texas, 131 Pupils)	
	Test I		Test II		Part I		Part II			
	Nation	Texas	Nation	Texas	Nation	Texas	Nation	Texas	Nation	Texas
9			20.5	20.5	30.5		11.9		16.1	
8			19.7	21.0	27.4		10.6		13.9	
7			17.4	21.6	23.9	28.8	9.3	10.5	7.8	11.9
6	18.1	19.7			20.2	19.0	8.2	9.8		
5	14.7	16.4			15.1	23.1	7.1	8.2		
4	10.3	11.0			9.6	16.6	5.6	7.2		

Figures have been compiled from *Reports* published by the Public School Publishing Company.[13]

[13]Mr. A. E. Hohenstein, of the Public School Publishing Company, kindly furnished these reports.

The first of the above tables shows that Texas pupils achieved just about the same as that achieved by other pupils in grades of the same number. The second table, on the other hand, shows in general a marked superiority of the Texas scores.

SUMMARY

From the foregoing studies we may state the following conclusions:

(1) So far as previously reported investigations reveal the facts, students who enter upon college and university work from eleven-year systems suffer little or no disadvantage beyond that of students who enter from twelve-year systems.

(2) The weight of evidence indicates that pupils from seven-year elementary schools in Texas probably do not achieve as much in seven years as others achieve in eight years, but it seems probable that in the better schools they are less than a year behind at the beginning of the high-school period. Reports from Kansas City indicate that the pupils there make a better showing.

(3) Much more evidence is needed before we shall be able to state the main facts with certainty, and still further study before we shall be able to make an analysis of the findings upon the basis of the several contributing factors.

CHAPTER IV

A COOPERATIVE STUDY OF ACHIEVEMENT

The purpose of this chapter is to report a coöperative study of achievement in the last four grades of certain seven-year elementary schools in Texas. The study was conducted under the auspices of the Bureau of School Inquiry, Division of Extension, of the University of Texas during the school year 1926–27. The writer acted as director of the study. Dean T. H. Shelby, of the Division of Extension, has ably coöperated in the making of arrangements and in carrying forward the work. Dean B. F. Pittenger, of the School of Education, and Dr. J. O. Marberry, Research Specialist of the Division of Extension, gave valuable counsel in the early part of the research. Miss Pauline Shirley, a graduate student in education, has greatly assisted by her study of the literature and by her work with the numerical results. Her unpublished master's thesis includes many of the data given in this report. Mr. T. E. Laughlin and other students have rendered valuable assistance in preparing data. Miss Bertha Duncan made a study of the results of the Otis Classification Test.

The World Book Company, publishers of the tests used in the study, generously coöperated in the research by extending liberal financial arrangements.

The study is coöperative in another sense. Superintendents and teachers in eighteen school systems have furnished the test results on which this study is based. This fact deserves special comment. The writer regrets that he is unable to publish all of the names of these able and willing collaborators. The following list must be confined largely to the superintendents. In some cases it has been possible to list the names of others who appear to have been closely connected with the administration of the testing program.

SCHOOL SYSTEMS CO-OPERATING IN STUDY

Alamo Heights—J. F. Howard, Superintendent.
Amarillo—W. A. McIntosh, Superintendent.
Austin—A. N. McCallum, Superintendent.
Anna K. Garretson, Supervisor of Elementary Education.
Beaumont—M. E. Moore, Superintendent.
Clara Mallory, Supervisor of Tests and Measurements.
Corsicana—H. D. Fillers, Superintendent.
Dallas—N. R. Crozier, Superintendent.
Del Rio—J. C. Cochran, Superintendent.
Mrs. J. C. Netts, Principal of Central School.
El Paso—A. H. Hughey, Superintendent.
R. R. Jones, Assistant Superintendent.
W. A. Stigler, Dean of Junior College.
Fort Worth—M. H. Moore, Superintendent.
Hattie O. Prewett, Director of Tests.
Galveston—E. G. Littlejohn, Superintendent.
Houston—E. E. Oberholtzer, Superintendent.
C. Mabel Smith, Director of Research.
Marshall—E. C. Deering, Superintendent.
Palestine—Bonner Frizzell, Superintendent.
San Antonio—Marshall Johnston, Superintendent.
Temple—L. C. Proctor, Superintendent.
Texarkana—H. W. Stilwell, Superintendent.
Tyler—G. O. Clough, Superintendent.
Waco—B. B. Cobb, Superintendent.

The coöperation is all the more remarkable when it is recalled that the tests in each system were given at the expense of that system. The sum of money which the Bureau of School Inquiry was able to set apart for this work was so small as to make it impossible to finance the testing program without assistance.

The enthusiasm for scientific research frequently revealed in letters from the various systems is particularly gratifying. Regardless of the outcome of the experiment, it has demonstrated the possibility of serious research through

coöperation of school systems with each other and with a central coördinating agency. It has been distinctly worth while and is highly encouraging to the scientific student of education. The writer wishes to express his hearty thanks to all who have had a part in this investigation and to acknowledge his deep indebtedness to them. Without their help the study would have been impossible; with it, the work has been a genuine pleasure.

Plan of Research

In October, 1926, a letter was sent to the superintendent of schools in each of the thirty Texas cities having a population over 10,000 according to the 1920 census. This letter raised the general question:

> Is the seven-year elementary school system of the South about to give way to an eight-year system?

In addition it suggested the desirability of a scientific study, contained an inclosure describing briefly the proposal for a study of achievement in grades four and seven, and asked whether the superintendent would be willing to join in the study.

In due time, with a very little follow-up, favorable replies were received from seventeen of the thirty cities. The superintendent in another system (Alamo Heights), a suburb of San Antonio, heard of the project and asked that his schools be included.[1]

There are obvious difficulties in securing optimum experimental conditions in a study of this kind. It would have been desirable, for example, to have one person or a similarly trained group of persons give all the tests in the several cities, and it would have been desirable also to test all the pupils in all the cities. Practical considerations

[1]See complete list of schools above. Hereafter, the schools will be referred to by letter, but the letters have been given according to a plan that will conceal the identity of the individual schools.

made these arrangements impossible. It was necessary to let each system do its own testing, and to resort to sampling in the choice of pupils for testing.

Detailed directions were sent out, however, in the effort to control conditions as far as possible. The following quotation from these directions will make clear the program by which the original data were secured.

COOPERATIVE RESEARCH PROJECT NO. 1

DIRECTIONS

(One copy for each examiner and for each scorer)

1. TIME. Give tests on six successive school days, beginning December 6, as follows:
   First day—Otis Classification Test, Form A, Part I.
   Second day—Same test, Part II.
   Third day—National Intelligence Test, Scale A, Form 1.
   Fourth day—Stanford Achievement Test, Advanced Examination, Form A, Part I (Tests 1, 2, 3).
   Fifth day—Same test, Part II (Tests 4, 5).
   Sixth day—Same test, Part III (Tests 6, 7, 8, 9).

2. SELECTION OF PUPILS FOR TEST.

   a. Give the program of tests in grade four and grade seven at least; include also grade five and grade six, if possible.[2] Test no negroes.
   b. If the entire grade throughout the city is not tested, select a sampling of *classes* that will be fair—representing neither the best nor the poorest only, but poor, average, and superior alike. If there are two or more elementary buildings (except small outlying buildings), make the selection from different buildings.
   c. Test *all* who are in a given instruction unit and present on the day of the test. *Do not* choose a few from several classes or sections to make up the test group.
   d. If possible, choose classes to which these particular tests have not been given.
   e. Unless the whole grade is tested, test only sections that entered the grade in SEPTEMBER. That is, *do not* take

[2]On advice of Dr. A. S. Otis of the World Book Company grades five and six were added to the original plan.

sections that began the work of the grade in the middle of the previous year.

3. GIVING TESTS.

   a. Follow closely the instructions of the several manuals of directions. Do not guess at the procedure.
   b. If a number of persons are to be utilized in giving the tests, have them meet under competent guidance for preliminary training.
   c. Time limits should be strictly observed. If stop watches are not available, use watches with second hands and write down the time of beginning and closing each test.
   d. Get the age and birthday accurately on the Otis test. This is the test from which ages will be recorded on the report.
   e. If inadvertently there is any departure from standard procedure, please describe it in your report.

4. SCORING THE TESTS.

   a. Read carefully and follow closely the directions given both in the manuals of directions and on the scoring stencils. Don't guess.
   b. Check all scoring and all numerical operations—that is, do every part of the work twice—unless experienced scorers are used. Inaccuracy here can defeat the whole program.

5. MAKING THE REPORT.

   a. Take special care in transcribing results upon the report blank. Make sure that the results reported for each pupil are the ones that belong to that particular pupil.
   b. Enough blanks are furnished herewith for duplicate records, one to be sent to the University and the other to be used in the local system.
   c. Original test blanks should be carefully filed that they may be available for further study, should occasion arise.
   d. Report ages of pupils as of the date of the Otis test, the first of the series. Take special care to see that they are accurate to the year and month. Age tabulations are among the most important that we shall make.
   e. In reporting ages, do not consider days. That is, if a child's age is 10 years, 7 months, 23 days, record the age as 10 years, 7 months.
   f. See that all blanks on the report are properly filled.
   g. If you can give any supplemental information or suggestions that will aid in interpreting the results, please do so.

6. MAILING THE REPORT.

a. The reports for the several sections tested should be assembled in the superintendent's office at the earliest opportunity and mailed, together with the general report compiled by the superintendent or his representative, to the Bureau of School Inquiry, Division of Extension, University of Texas, Austin.

The report blank consisted of a long sheet of paper arranged to secure the following information:

REPORT—COOPERATIVE RESEARCH PROJECT NO. 1

Use a separate blank for each class unit in each grade in which the tests are given.

Grade_____ City_____ School_____ Teacher_____ Date of tests_____

Did this section begin work of this grade in September or in February? _____

Which ones, if any, of the tests have these pupils taken before? _____

Have general and special directions been carefully followed?_____

Exceptions, of any_____

If a child is a Mexican, mark M.

Record all scores in points.

Examiner Scorer

Otis: _____ _____

N. I. T._____ _____

St. Ach._____

Names (Alphabetically)	Mex.?	Age day of Otis Test		Score Otis Cl. Test		Score Nat'l Int. Test
		Yr.	Mo.	Pt. I	Pt. II	

Scores in Stanford Achievement Test, Advanced Examination, A

Test 1 Par.	Test 2 Sen.	Test 3 Word	Total Read	Test 4 Ar. C	Test 5 Ar. R	Total Arith.	Test 6 Na & S	Test 7 Hi & L	Test 8 Lang	Test 9 Dict	Total Score	Comments

Additional data were requested on the form shown below:

COOPERATIVE RESEARCH PROJECT NO. 1

SUPERINTENDENT'S REPORT

(The following data are sought to assist in interpreting the statistical results. If it is not convenient to answer all the questions, please answer the first four at least.)

1. How many years are there in your elementary school—7 or 8?_____.
2. What is the length of your school year?_____days.
3. How does the number of pupils tested in each grade compare with the total number enrolled in the grade? (Whites only.)

	Grade 4	Grade 5	Grade 6	Grade 7
Number tested				
Total enrollment				

4. If only a part of each grade was tested, do you consider the sampling as probably fair—representing poor, average, and superior pupils without undue selection of either?
5. What is the average salary of elementary teachers in your school system? $_____per year.
6. Qualifications of teachers IN THE SECTIONS TESTED.

Teacher	Grade	Number of years training above high school	Number of years experience previous to this one. Total	In this system

7. Please attach separate sheet for additional remarks, if any, that will assist in interpreting the results.

Report made by_____

City _____Date _____Position _____

In general, it is believed that the several school systems followed instructions carefully. The writer has been highly gratified by the evident care with which reports were made.

PROBLEM OF SELECTION[3]

The greatest problem and the greatest uncertainty have centered in the method of selecting pupils. This was foreseen and carefully considered. Theoretically, a chance selection—for example, every fifth pupil on the roll—would

[3]See also p. 70.

have approximated the ideal. However, we faced the practical difficulty of administering such a program for so long a series of tests, the possibility of miscarriage of the plan without some form of personal supervision that we were financially unable to give, and the probability of placing pupils at a disadvantage when tested under conditions so unusual. Our plan of selection, therefore, seemed the best that could be devised to meet the practical situation.

It will be observed that an attempt was made to select representative *sections* rather than individuals. In general, the selection was small for each city, but we hoped in the aggregate to get enough pupils to represent conditions in the several grades. It should be emphasized for the casual reader than in nearly all the cities the number of pupils is so small that *no inference concerning the standing of the city can be drawn from the showing made.*

Number and Distribution of Pupils Tested

When the report blanks were received, tabulations were made for each of the three tests—Otis Classification Test (Parts I and II, separately), National Intelligence Test, and Stanford Achievement Test (total score and each of the six subjects—reading, arithmetic, nature study and science, history and literature, language usage, and spelling). Only pupils were included who had scores on all of the tests and on whom age data were given. Table V shows the number and distribution of pupils whose scores were included in the tabulations.

TABLE V

Number and Distribution of Pupils

	L4	H4	L5	H5	L6	H6	L7	H7	Total
A	117						120		237
B	21	19	27	33	30	17	28	19	194
C	100		49		97		99		345
D	53		55		60		18	48	234
E	138	24	129	33	45	43	45	45	502

	L4	H4	L5	H5	L6	H6	L7	H7	Total
F	119						54		173
G	96						95		191
H	15		15	18	14	15	28		105
I	371		346		266		98		1081
J	138		120		127		136		521
K	58		53		62		50		223
L	73		80		79		65		297
M	97						92		189
N	88	36	88	36	102	48	82	53	533
O	226		236		130		184		776
P	44	20	60	40	49	50	50	49	362
Q	79	39	98	65	78	50	94	62	565
R	86						96		182
Total	1919	138	1356	225	1139	223	1434	276	6710

L means *low* and designates the section which began the work of the grade in September.

H means *high* and designates the section which began the work of the grade in February of the preceding school year.

The table shows, for example, that in City A 117 pupils in the low fourth and 120 pupils in the low seventh contributed to the test data.

It may be seen from the foregoing table that this study is based upon tests of 6,710 pupils distributed through the low and high sections of grades four to seven, inclusive, and that from five to eighteen school systems are represented in each section.

Results of the Test

The average score for each section on the three tests is shown in Table VI.

TABLE VI

POINT SCORES IN INTELLIGENCE AND ACHIEVEMENT

	No. of Schools	No. of Pupils	MEDIANS Otis Classification Test		National Intelligence Test	Stanford Achievement Test
			Part I	Part II		
High 7	6	276	62.5	53.2	133.5	71.8
Low 7	18	1434	60.2	49.5	128.3	67.0
High 6	6	223	55.3	44.1	120.3	60.8
Low 6	13	1139	47.7	39.7	115.8	57.2
High 5	6	225	36.7	31.9	107.5	50.5
Low 5	13	1356	35.6	31.1	97.5	48.2
High 4	5	138	30.0	23.3	91.8	40.0
Low 4	18	1919	23.0	21.1	81.2	37.7

The table shows, for example, that in the high seventh grade 276 pupils distributed among six schools were tested, and that these pupils made median scores 62.5 and 53.2, respectively, on Parts I and II of the Otis Classification Test.

The average used in the preceding table is the median of the medians of the several school systems. That is to say, first the median score for a city was found and then the median of these medians was taken to represent the general average. This method gives all the school systems equal weight regardless of the variation in the number of pupils who represent the several systems.

Inasmuch as norms in the Stanford Achievement Test are based upon means, the means also were computed for the total scores on the test. These are shown in Table VII. The table shows, too, the means of combined distributions representing all cities. To find these means the scores of the pupils of a given grade in all cities were thrown together. The table shows, also, median scores calculated in the two ways just described in relation to the mean. It will be observed that either set of "averages" might have been used in this report without substantially different results.

Means are given in Table VII for each city and are arranged in order of magnitude to show their variability. A

given city, of course, does not have the same rank in all the grades. Indeed, as we have already pointed out, the average for a given city is in most cases based upon so small a sampling that it can not be taken as a true measure of that city's standing.

TABLE VII

MEAN SCORES IN STANFORD ACHIEVEMENT TEST

(Scores in each grade arranged in order of magnitude)

Rank	Low 4	High 4	Low 5	High 5	Low 6	High 6	Low 7	High 7
1	43.5	46.2	53.5	55.0	64.5	66.6	74.0	72.8
2	41.8	42.1	52.3	53.3	61.5	63.0	72.6	72.2
3	40.8	40.3	50.6	52.2	60.4	60.8	71.8	71.6
4	40.8	39.4	49.4	49.8	59.1	59.1	71.4	71.3
5	40.7	39.1	48.9	49.3	58.3	58.2	70.1	68.1
6	40.7		48.6	42.0	57.2	53.2	69.0	66.6
7	40.6		48.1		55.9		68.8	
8	38.5		47.6		55.5		68.1	
9	38.3		47.5		54.5		67.8	
10	37.9		45.9		53.6		66.6	
11	37.8		44.5		52.6		66.2	
12	37.4		44.1		51.9		65.3	
13	37.4		42.1		38.9		64.1	
14	36.7						63.8	
15	36.3						63.7	
16	35.5						61.0	
17	35.0						60.6	
18	32.8							
Mean of Above Means	38.5	41.4	47.9	50.3	55.7	60.1	67.5	70.4
Mean of Combined Distribution	37.6	41.4	48.3	49.7	57.6	59.1	67.8	70.3
Median of Medians	37.7	40.0	48.2	50.5	57.2	60.8	67.0	71.8
Median of Combined Distribution	37.9	41.2	47.9	49.4	56.3	59.3	67.5	70.4

The table shows the mean point scores for eighteen cities in the low fourth grade: 43.5, 41.8, etc.; mean and median scores for all the cities as explained in the text; and so on.

Use of Grade Equivalents

The scores recorded in the preceding tables are expressed in terms of points. Their significance is not clear, however, until they are compared with norms. It will simplify the comparison, too, to translate the scores on the several tests into common units. One way to accomplish this result is to express the scores in terms of grade equivalents—in terms of the school grades for which the given scores are average. For example a point score of 62 on Part I of the Otis Classification Test is considered average for pupils at the close of the ninth month of the eighth grade in a school term of ten months. The grade equivalent, then, of a point score of 62 on this test is 8.9. Or to turn the matter around, the expected score for grade 8.9 is 62 points.

Similarly, a score of 23 on the same test represents a grade status of 4.4; that is, according to the table of norms, the average score of pupils at the close of the fourth month of the fourth grade is 23 points. In the next few tables, then, the scores of pupils will be expressed in terms of the grades for which their point scores are considered average.[4]

One advantage of expressing class averages in terms of grade status lies in the possibility of making a direct comparison of the grade in which pupils actually are at the time of the test, on the one hand, and the grade equivalents of their scores, on the other. For instance, if a class is at the close of the fifth month of the sixth grade (expressed as 6.5) and makes a grade score of 6.5, it is doing average work. If it makes a grade score of 6.1, however, it is four months behind the average. And if it makes a score of 7.1, it is doing work equivalent to that of the average class six months farther along.

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[4]The norms used are found in the following: "Grade Status Values Corresponding to Scores in the Otis Classification Test," a mimeographed sheet kindly furnished by Dr. A. S. Otis, author of the tests; *Supplement No. 3 to Manual of Directions*, National Intelligence Tests; *Manual of Directions*, Stanford Achievement Test, 1926.

SEVEN-YEAR AND EIGHT-YEAR SYSTEMS

But grade norms in the tests used in this study are based primarily upon test results in twelve-grade school systems. A grade score of 8.9 means the achievement at the close of the ninth month of the eight grade of a twelve-year system. This is approximately the close of the ordinary eight-year elementary school. In comparing the achievement of pupils of seven-year and eight-year systems, therefore, it is helpful to make some adjustment that will express actual grade placement and grade scores in common terms. In the following tables this has been accomplished by giving theoretical eight-grade-system equivalents for the grades of the seven-year schools. It is assumed, for example, that a pupil who is in the ninth month of the seventh grade (expressed as 7.9) of a seven-year system is the equivalent of a pupil in the ninth month of the eighth grade (expressed as 8.9) of an eight-year system.

The method used for obtaining eight-grade-system equivalents of seven-year-system grades is but one of a number that might be used and perhaps defended just as well. It is based on the assumption (which probably is not altogether sound) that pupils in the two systems begin at the same point with reference to achievement and on the further assumption that they are to accomplish the same results in eight and seven years, respectively. For simplicity, it is assumed also that the yearly progress expressed in grades is a straight-line progress. This method and one other possible method are illustrated in Figure 2.

In the foregoing graph the solid lines represent the assumptions made in this study regarding progress of pupils through seven-year and eight-year systems. It is shown, for example, that a pupil in a seven-year system is expected to attain a point at the end of 3.5 years (middle of fourth grade) reached by a pupil in an eight-year system at the end of four years (end of fourth grade).

The dotted line represents equivalent grade positions on the assumption that the pupils begin at the same point

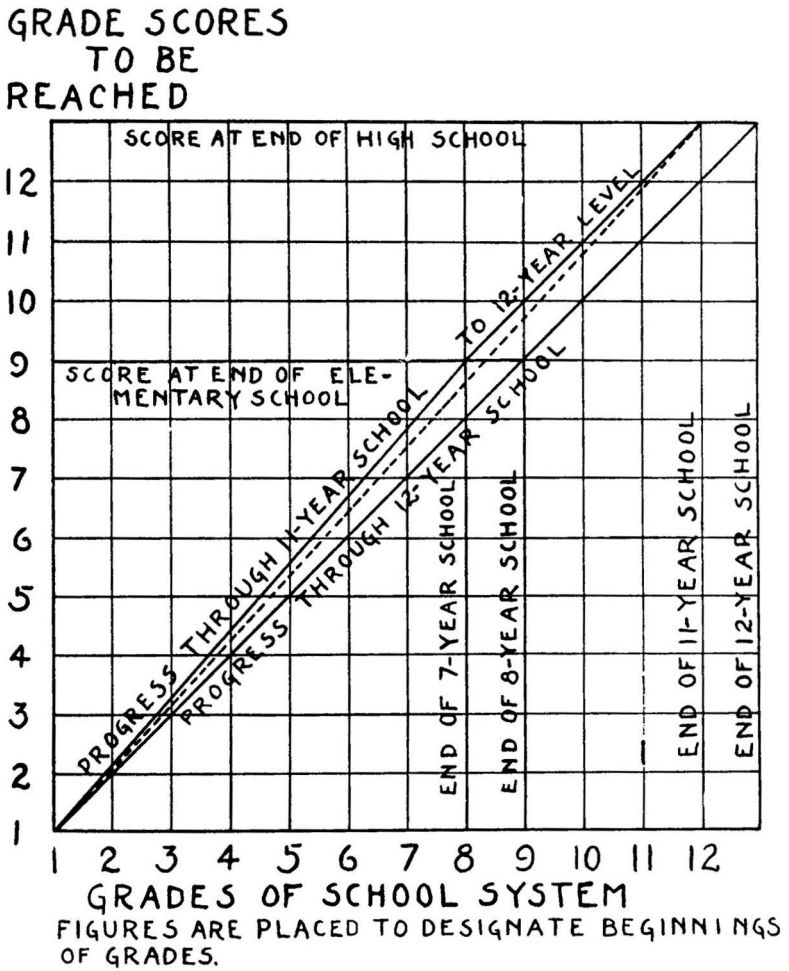

Figure 2.—Equivalent Grade Progress.

The horizontal scale represents grades of eleven-year and twelve-year systems. The vertical scale represents the twelve-year-system grade levels to be reached. The diagonal lines show the grade levels to be reached in the several grades of eleven-year and twelve-year systems.

and accomplish in eleven years as much as others accomplish in twelve. On this assumption the seven-year-system

pupil would be expected to attain in about 3.7 years the point reached by the eight-year-system pupil in four years.

Other methods of comparison could be used assuming different starting points and different periods of years for attaining equal results. It is possible, for example, that pupils in the two systems should be expected to arrive at the same point in achievement just at the beginning of the senior high school. In any case, it is clear that the method which has been used gives the seven-year system no undue advantage in the comparisons made in this investigation; on the contrary, in the grades studied it probably places it at some disadvantage.

Grade Scores in Intelligence and Achievement

In Table VIII the grades which the pupils have reached are compared with the grade scores which they attained in the Otis Classification Test. The results are shown graphically in Figure 3.

TABLE VIII

Otis Classification Test, Parts I and II

(1)	(2)	(3)	(4)	(5)
Grade	Grade Reached in Seven-Year System	Eight-Year Equivalent of Grade Reached (Expected Score)	Median Scores in Terms of Grades: Part I (Achievement)	Median Scores in Terms of Grades: Part II (Intelligence)
High 7	7.8	8.8	8.9	9.0
Low 7	7.3	8.2	8.5	8.3
High 6	6.8	7.6	7.8	7.5
Low 6	6.3	7.1	6.8	6.8
High 5	5.8	6.5	5.7	5.7
Low 5	5.3	5.9	5.6	5.6
High 4	4.8	5.3	5.1	4.7
Low 4	4.3	4.8	4.4	4.5

In this and subsequent tables the grades reached by the pupils tested are given as 4.3, 4.8, 5.3, 5.8, and so on. The tests were administered for the most part in December—that is, approximately

three months after the beginning of the school year. The addition of .3 to 4.0, 4.5, etc., gives the figures recorded in column (2) of the table.

The third column has been derived as explained above. The pupils in the low fourth grade (4.3), for example, are expected to accomplish work equivalent to that done by pupils in the high fourth (4.8) of an eight-grade system.

The actual standing on the test is indicated in columns (4) and (5). It is shown, for example, that low-fourth-grade pupils, who are expected to have a grade of 4.8, have an achievement score of only 4.4 and an intelligence test of 4.5. That is to say, their actual standing is four and three months, respectively, behind their expected standing.

Inspection of the table and graph reveals the following facts:

(1) The achievement scores and intelligence scores are closely parallel. On the whole, the pupils did about as well on one test as on the other.

(2) In the fourth grade the achievement is from two to four months below that expected of pupils who are to complete eight years work in seven, but in the seventh grade —that is, at the close of the elementary school—it is from one to three months higher.

(3) With slight exceptions both the intelligence and the achievement scores are above those expected in eight-year-system grades of the same number.

On the face of the results, then, it appears that pupils in these schools overcome a handicap in the middle grades and finish the seven elementary grades both with general mental ability (intelligence) and with achievement a little superior to the attainments of pupils in the eight-grade systems on which the Otis norms are based.

Table IX and Figure 4 show the median intelligence and achievement as measured by the National Intelligence Test and the Stanford Achievement Test, respectively.

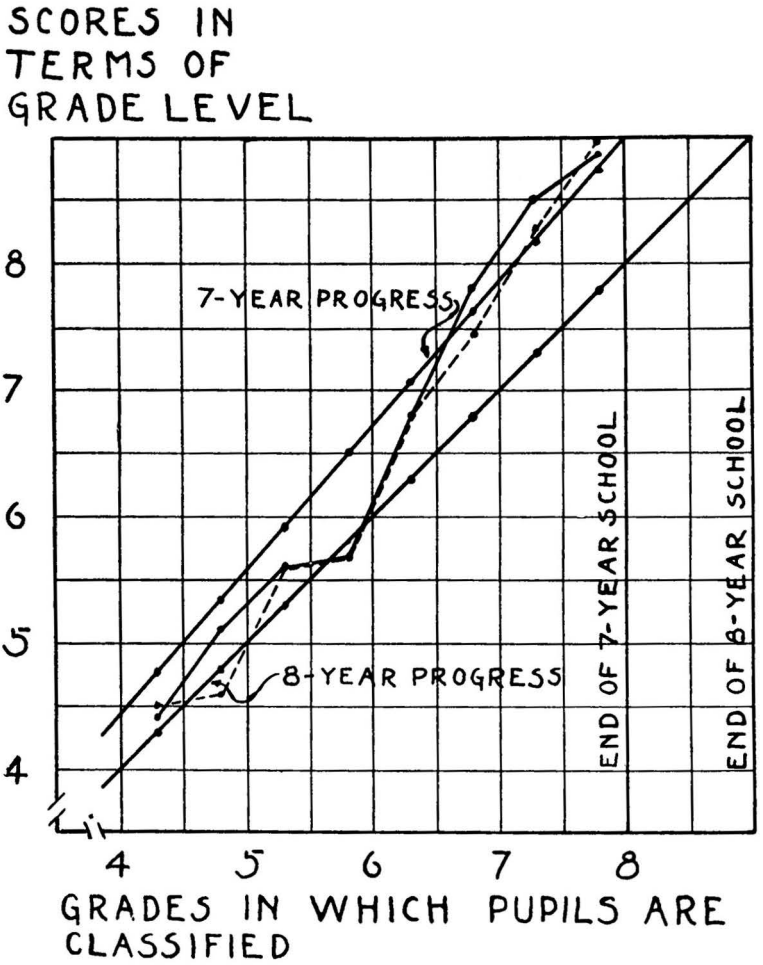

Figure 3.—Otis Classification Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, achievement; dotted, intelligence. Straight lines show expected progress through schools in seven and eight years, respectively. Points indicate places at which tests were made—grades 4.3, 4.8, etc. Note the rise of the scores in grade 7.

TABLE IX

NATIONAL INTELLIGENCE TEST AND STANFORD ACHIEVEMENT TEST

(1) Grade	(2) Grade Reached in Seven-Year System	(3) Eight-Year Equivalent of Grade Reached (Expected Score)	(4) Median Scores in Terms of Grades: Stanford Achievement Test	(5) Median Scores in Terms of Grades: National Intelligence Test
High 7	7.8	8.8	8.5	8.6
Low 7	7.3	8.2	7.9	8.0
High 6	6.8	7.6	7.2	7.4
Low 6	6.3	7.1	6.7	7.0
High 5	5.8	6.5	6.1	6.5
Low 5	5.3	5.9	5.8	5.9
High 4	4.8	5.3	5.1	5.5
Low 4	4.3	4.8	4.9	5.0

For a general explanation of the table, see the text following Table VII. The grade scores on the National Intelligence Test were computed from Table V of *Supplement No. 3 to the Manual of Directions*, using scores for the low sections only.

These tests, as in the case of the Otis Classification Test show in general a close parallel between intelligence and achievement. But the intelligence score on the National Intelligence Test is uniformly higher (two-tenths of a year, on the average) than the achievement score on the Stanford Achievement Test. This was not true of the Otis Classification Test scores.

The achievement, as measured by the Stanford Achievement Test, shows a slightly different picture from that revealed by the Otis Test. In the Stanford Achievement results, the score is above the expected level in only one case (low fourth grade), but in the seventh grade it reaches a point three months below the expected level.

The intelligence of these pupils, as measured by the National Intelligence Test, closely approximates the expected

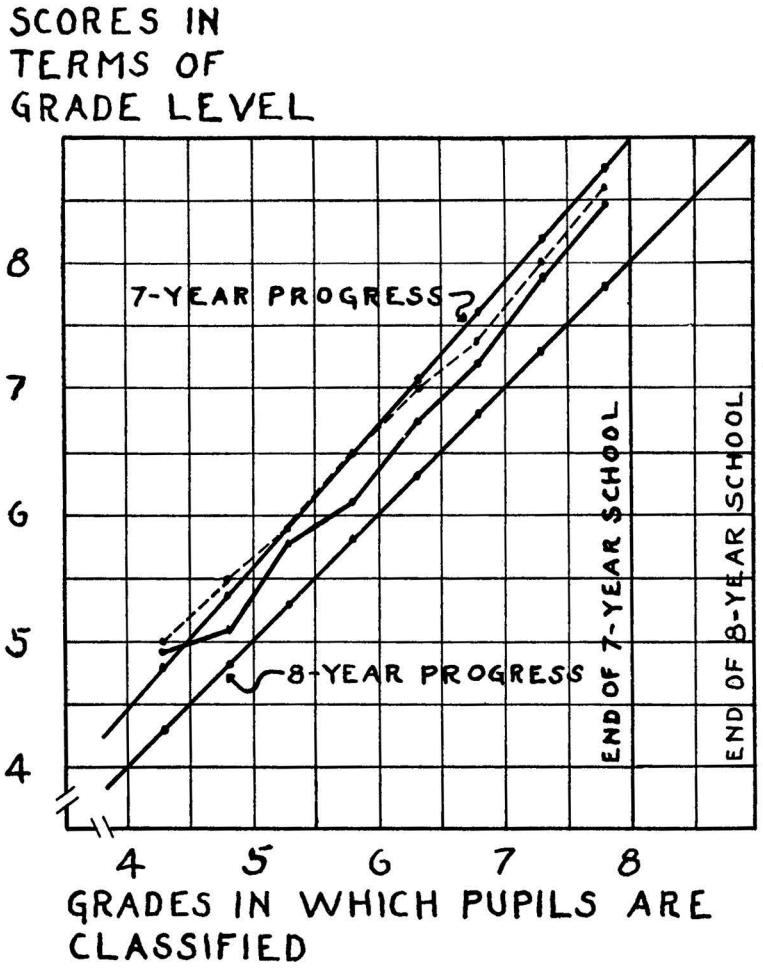

Figure 4.—National Intelligence and Stanford Achievement Scores in Comparison with Expected Scores.

Broken lines indicate actual scores—solid, achievement; dotted, intelligence. Straight lines show expected progress through schools in seven and eight years, respectively. Points indicate places at which tests were made—grades 4.3, 4.8, etc. Note the near approach to the seven-year standard.

score, rising two months above it in the fourth grade and falling two months below it in the seventh.

Both the achievement and intelligence scores are above those expected in eight-year-system grades of the same number.

Stanford Achievement Sub-Tests

The achievement of pupils in the several sub-tests of the Stanford Achievement Test[5] is shown in Table X. Figures 5 to 10 inclusive, show the same results and carry also a line representing the total Stanford Achievement score.

The grade equivalents in the following table are taken from Table VIII of the Manual of Directions. The actual grade averages, however, are given in Table VII of the Manual. There is some discrepancy between these tables on the sub-tests—particularly in the history and literature test. The use of Table VIII for finding grade equivalents in this test seems to place our pupils lower than they should be placed in comparison with the pupils on whom the norms are based. In certain other tests, however, they seem to be at a slight advantage.

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[5]The three tests in reading have been combined as have the two tests in arithmetic.

TABLE X

STANFORD ACHIEVEMENT SUB-TESTS

(1) Grade	(2) Grade Reached in Seven-Year System	(3) Eight-Year Equivalent of Grade Reached (Expected Score)	(4) Median Score in Terms of Grade Level: Reading	(5) Arithmetic	(6) Nature Study and Science	(7) History and Literature	(8) Language Usage	(9) Dictation (Spelling)
High 7	7.8	8.8	8.6	8.1	8.2	8.5	9.5	8.0
Low 7	7.3	8.2	8.1	8.0	7.7	8.0	9.0	7.8
High 6	6.8	7.6	7.1	7.3	7.4	7.1	7.6	6.4
Low 6	6.3	7.1	6.7	6.6	6.7	6.6	7.7	6.7
High 5	5.8	6.5	6.1	6.1	6.2	5.7	7.3	5.8
Low 5	5.3	5.9	5.9	5.8	5.9	5.7	6.5	5.7
High 4	4.8	5.3	5.2	5.2	5.4	4.7	5.7	5.3
Low 4	4.3	4.8	4.9	4.9	4.9	4.7	5.4	4.9

For a general explanation of the table, see the text following Table VII.

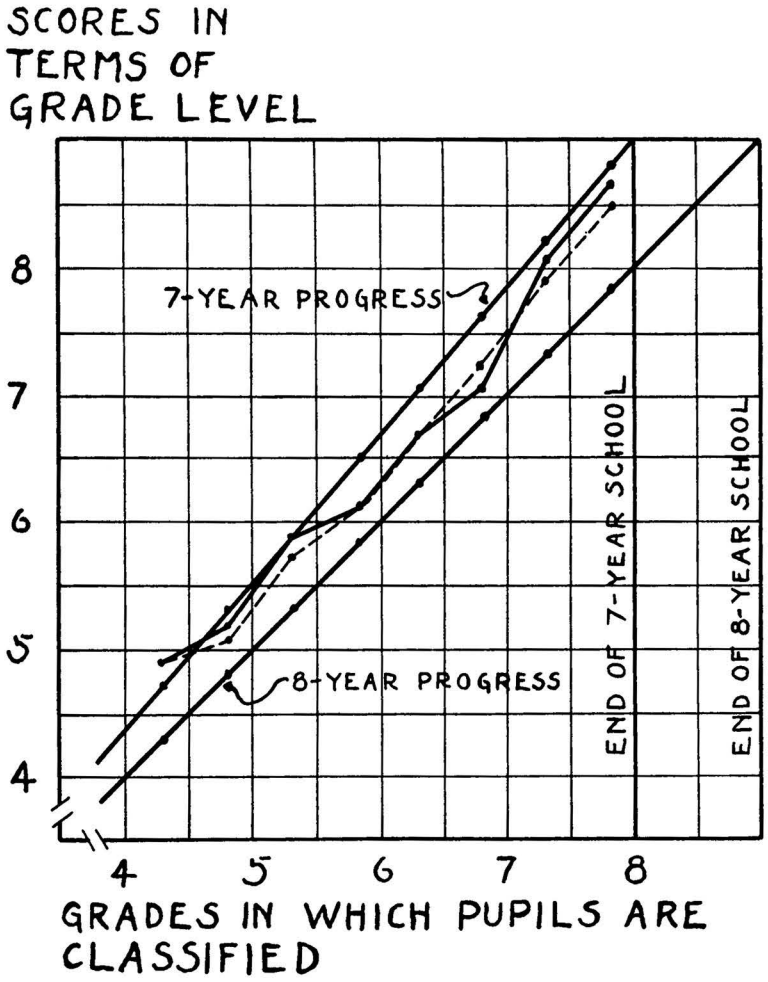

Figure 5.—Reading and Stanford Achievement Total Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, reading; dotted, Stanford Achievement total. Note the close approximation to the seven-year standards in the fourth and seventh grades.

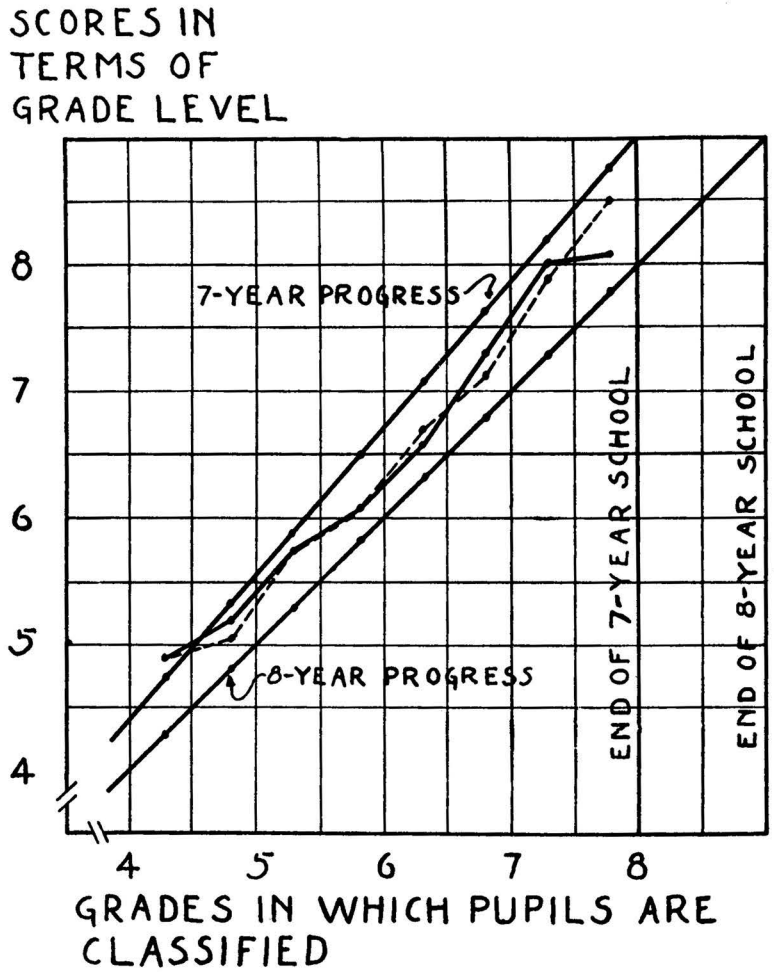

Figure 6.—Arithmetic and Stanford Achievement Total Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, arithmetic; dotted, Stanford Achievement total. Note the close parallel between the total scores and the scores in arithmetic.

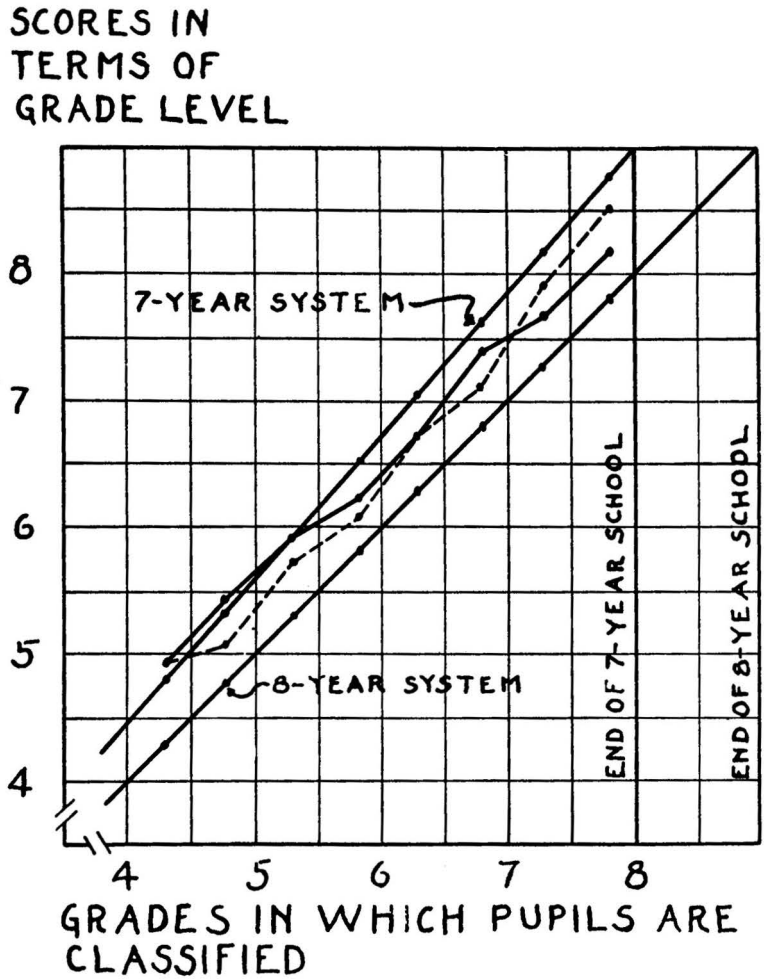

Figure 7.—Nature Study and Science and Stanford Achievement Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, nature study and science; dotted, Stanford Achievement total. Note the comparative weakening in elementary science with progress through the grades.

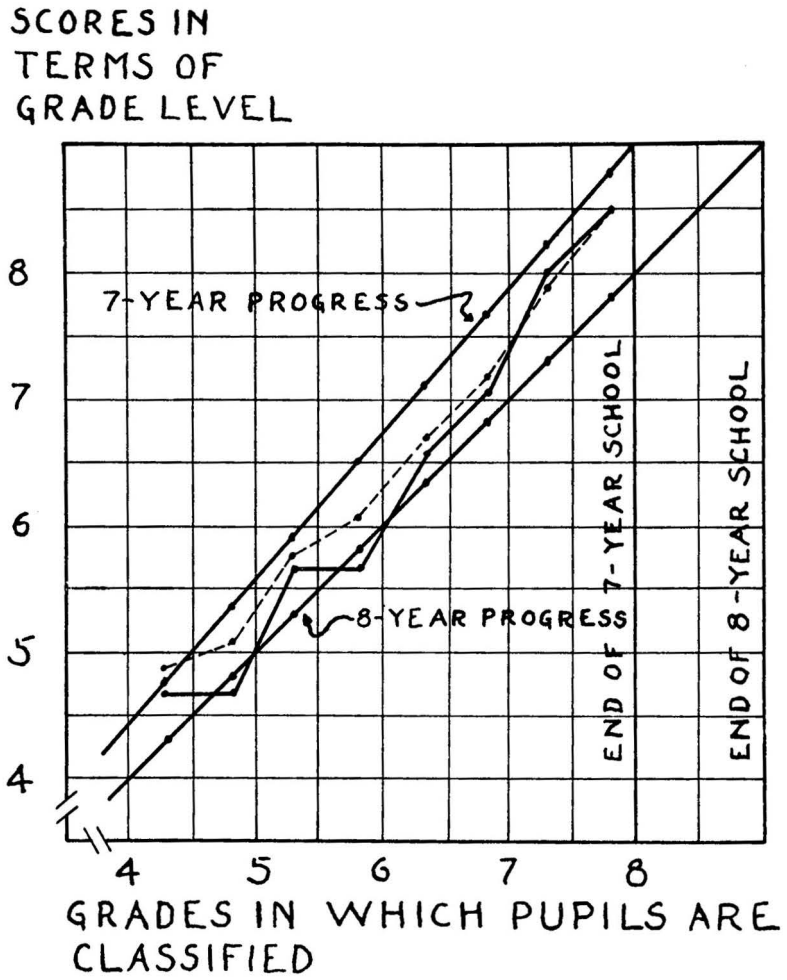

Figure 8.—History and Literature and Stanford Achievement Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, history and literature; dotted, Stanford Achievement total. Note the relatively low scores in the lower grades.

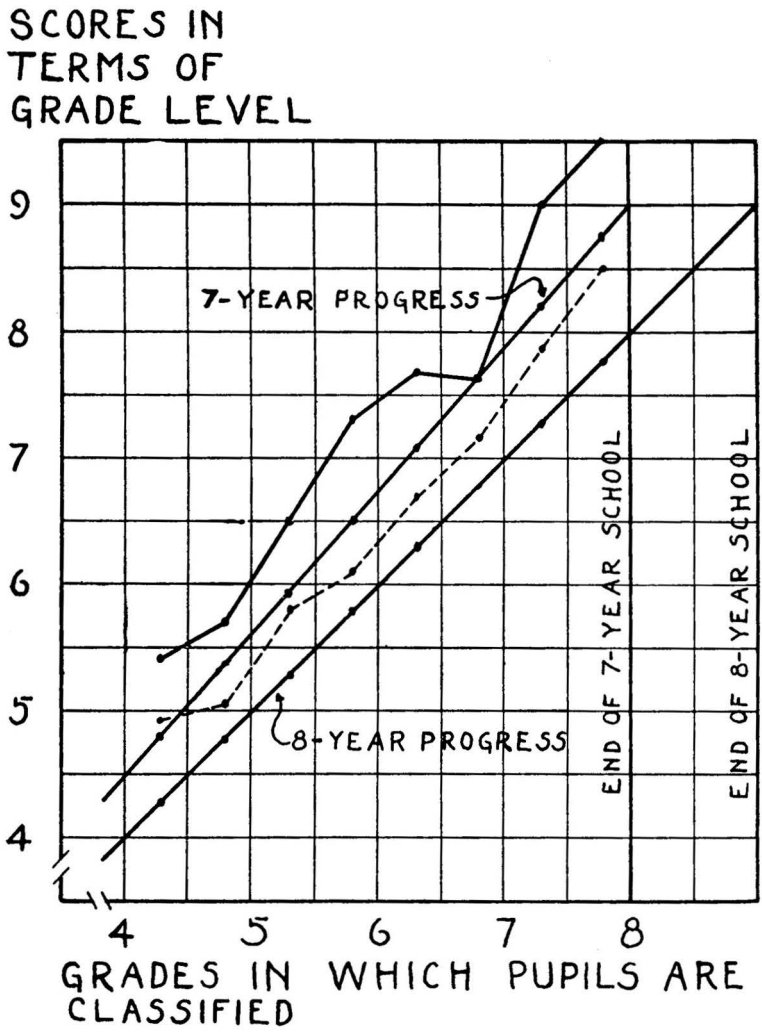

Figure 9.—Language Usage and Stanford Achievement Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, language usage; dotted, Stanford Achievement total. Note the marked superiority of these pupils in language usage.

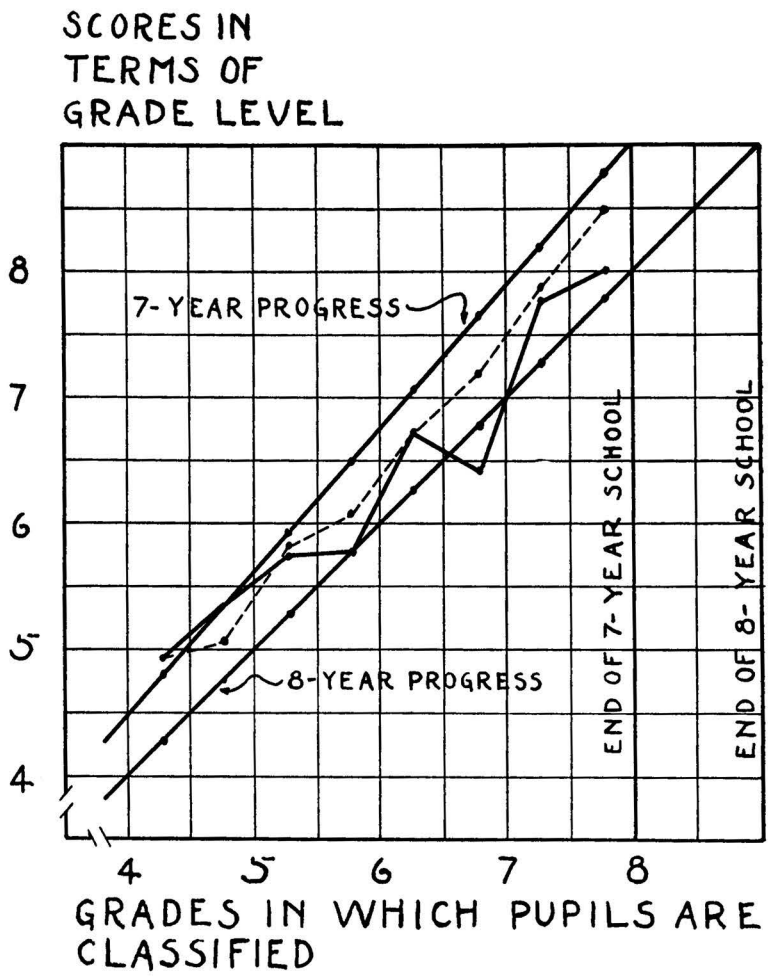

Figure 10.—Spelling (Dictation) and Stanford Achievement Scores in Comparison with Expected Scores.

Broken lines show actual scores—solid, spelling; dotted, Stanford Achievement total. Note the relative weakness of these pupils in certain sections of the upper grades.

As may be expected, the several sub-tests follow in general the curve shown by the Stanford Achievement totals. The scores on language usage, however, are a marked exception,

being uniformly higher than the scores on all other subtests and higher than the expected score on language usage in every grade except the high sixth. This high standing in language usage suggests the interesting possibility that there may be a real sectional difference related perhaps to immigration. It may be that a better quality of English is spoken in this section of the South than is spoken in the communities from which material for the norms was obtained.

Variability of Scores

The distribution of scores on the National Intelligence Test and the Stanford Achievement Test in the several grades is shown in Tables XI and XII. Scores of pupils from the several schools have been thrown together to make these tables.

TABLE XI

Distribution of Scores on National Intelligence Test

(Figures in body of table show number of pupils)

	Grade 4		Grade 5		Grade 6		Grade 7	
Scores	Low	High	Low	High	Low	High	Low	High
180–189							4	
170–179				1	4		21	5
160–169			1	1	8	2	63	16
150–159			10	4	27	7	128	33
140–149	4		20	9	75	12	203	44
130–139	11	1	63	12	128	30	263	**52**
120–129	33	5	119	23	217	47	**264**	52
110–119	85	11	178	34	**232**	**45**	230	38
100–109	147	19	237	**39**	191	32	128	21
90–99	290	**33**	**234**	31	121	26	80	8
80–89	**344**	**28**	216	41	80	14	31	3
70–79	**359**	11	131	15	40	6	11	4
60–69	297	15	85	12	14	2	2	
50–59	185	10	39	2	5		4	
40–49	106	3	18		2		2	
30–39	40	2	2					
20–29	17		1		1			
10–19	1		1					
0–9			1	1				
Total No.	1919	138	1356	225	1139	223	1434	276
Median Score	78.7	90.0	97.9	102.7	114.9	117	128.7	132.3

TABLE XII

DISTRIBUTION OF SCORES OF STANFORD ACHIEVEMENT TEST

(Figures in body of table show number of pupils)

	Grade 4		Grade 5		Grade 6		Grade 7	
Scores	Low	High	Low	High	Low	High	Low	High
95-99							2	1
90–94					1		17	6
85–89			1		1		72	17
80–84				1	18	3	125	24
75–79	1		4	3	47	6	168	46
70–74			15	2	63	20	209	**48**
65–69	5		45	15	131	35	**252**	51
60–64	9	2	83	18	197	42	233	35
55–59	42	4	172	24	**207**	**41**	177	26
50–54	88	16	240	45	221	29	108	16
45–49	224	24	**291**	**44**	132	34	53	4
40–44	380	**30**	247	32	78	11	11	2
35–39	**459**	31	153	23	29	1	6	
30–34	414	20	73	12	9		1	
25–29	189	9	25	3	4			
20–24	80	1	6	3	1	1		
15–19	22	1	1					
10–14	5							
5–9	1							
Total No.	1919	138	1356	225	1139	223	1434	276
Median Score	37.9	41.2	47.9	49.4	56.3	59.3	67.5	70.4

These distribution tables reveal a wide scattering among the scores and an extensive overlapping of abilities in the several grades. This is the result in part of combining scores from different schools. In the low fourth grade, for example, the median scores on the National Intelligence Test for the eighteen systems show considerable variation—93.4, 88.8, 87.0, 85.5, 85.4, 84.6, 83.6, 81.4, 81.3, 81.1, 80.5, 80.0, 78.5, 73.3, 72.3, 72.2, 71.3, 70.9. At the same time there is, for the most part, a marked variation of scores within a single grade of the several systems. This variation is illustrated in Table XIII.

TABLE XIII

VARIATION OF SCORES IN THE LOW FOURTH GRADE OF THREE SYSTEMS—NATIONAL INTELLIGENCE TEST

(Figures in body of table show number of pupils)

Scores	City B	City I	City J
140–149	--	--	2
130–139	--	1	1
120–129	--	1	7
110–119	4	13	14
100–109	2	19	22
90– 99	4	34	35
80– 89	4	54	17
70– 79	3	80	18
60– 69	4	62	14
50– 59	--	47	7
40– 49	--	42	1
30– 39	--	13	--
20– 29	--	4	--
Total	21	371	138
Median	88.8	72.2	93.4

Incidentally, the variation illustrated in the foregoing tables suggests the need for a careful consideration of problems of classification in the several systems. It is certain that we should not expect equal progress of different pupils in any given period. Eleven per cent of the pupils in the low sixth grade and 41 per cent of the pupils in the low seventh grade have Stanford Achievement scores equal to or greater than the average accomplishment of pupils in the low eighth grade of eight-year systems, while 48 per cent of the high seventh grade have not yet reached that level of accomplishment. (See Table XII.)

AGES OF PUPILS TESTED

The comparison of scores with norms up to this point has been made on the basis of grade level without consideration of ages. While the results of the tests are not entirely consistent, in general the scores made by pupils in this study have exceeded the scores set up for pupils in grades of the same number in twelve-year systems, but have fallen a

little short of the scores expected of pupils who would complete eight years' work in seven years. On the whole, the showing has been a distinctly favorable one, suggesting the possibility that pupils in the best Texas schools are accomplishing in seven years as much in certain subjects as other pupils accomplish in a longer period.

The median ages of the pupils whose test scores have been shown in the preceding tables are presented in Table XIV. For comparison with these ages, the Stanford Achievement norms for the respective grade levels are given.[6]

TABLE XIV

ACTUAL AGES AND STANFORD ACHIEVEMENT AGE NORMS

	(1) Actual Grade	(2) Stanford Achievement Norms for This Grade	(3) Actual Age of Pupils in Grade	(4) Corresponding Grade in Eight-Year System	(5) Stanford Achievement Norms for This Grade
High 7	7.8	13.6	13.7	8.8	15.0
Low 7	7.3	13.0	13.3	8.2	14.2
High 6	6.8	12.6	12.7	7.6	13.4
Low 6	6.3	12.1	12.2	7.1	12.8
High 5	5.8	11.7	11.8	6.5	12.3
Low 5	5.3	11.2	11.4	5.9	11.8
High 4	4.8	10.8	11.0	5.3	11.2
Low 4	4.3	10.2	10.3	4.8	10.8

Key: (1) The grade levels corresponding to high 7, low 7, etc., in the third month of school.
(2) The chronological ages of pupils in the grades shown in column (1). (From Stanford *Manual.)*
(3) The median ages of the pupils in the several grades.
(4) The grade levels in an eight-year system corresponding to 7.8, 7.3, etc., on the assumption that the seven-year-system pupils are completing eight years' work in seven years.
(5) The chronological ages of pupils in the grades shown in column (4). (From Stanford *Manual.)*

[6]*Manual of Directions*, 1926, Table VIII.

Reference to the table shows that the pupils tested are a little older than the Stanford Manual lists as normal for these grades, but the difference is very small (average 1.8 months). On the other hand, they are younger (in the higher grades much younger) than pupils in eight-year systems who are comparatively as close to the end of their elementary school period. Probably, then, their superior accomplishment in the abilities measured can not be adequately explained on the basis of greater chronological age.

The actual ages of the pupils tested may be compared with their mental and educational ages by reference to Table XV.

TABLE XV

ACTUAL AGES, MENTAL AGES, AND EDUCATIONAL AGES OF PUPILS

(1) Grade	(2) Actual Age	(3) Mental Age		(4) Mental Age	(5) Educational Age	(6) Educational Age
		Otis		N. I. T.	Otis	Stan. Ach.
High 7	13.7	14.3		14.5	14.6	14.5
Low 7	13.3	13.7		13.9	14.2	13.7
High 6	12.7	12.8		13.3	13.3	12.9
Low 6	12.2	12.1		13.0	12.3	12.5
High 5	11.8	11.2		12.4	11.1	11.9
Low 5	11.4	11.0		11.8	11.0	11.7
High 4	11.0	10.0		11.4	10.4	11.0
Low 4	10.3	9.7		10.8	9.7	10.8

Key: (1) Grades in which pupils are classified.
(2) Median ages of pupils tested.
(3) Mental ages equivalent to score on Otis Classification Test, Part II. See *Manual of Directions*, 1923, p. 21.
(4) Mental ages equivalent to scores on National Intelligence Test, Scale A. See Supplement No. 3 of *Manual of Directions*, p. 5.
(5) Educational ages equivalent to scores on Otis Classification Test, Part I.
(6) Educational ages equivalent to scores on Stanford Achievement Test. See *Manual of Directions*, 1926, Table VIII.

Are These Tests Fairly Representative?

Before acting upon the results revealed by the testing program of this study, it is pertinent to ask whether they are fairly representative of seven-year elementary schools in comparison with eight-year schools. The answer so far as all schools are concerned is simple—they are not representative and were never intended to be. There is ample evidence (in the Texas Survey, for example) to show that in general better test results are obtained from cities than from the country. Our showing would doubtless have been somewhat lower if rural schools had been included. It was our deliberate intention to test the work of the better seven-year schools—so far as quality is associated with size.

We can not even assert that the sampling we have secured represents fairly all cities of the State. The army experience with tests of very large groups suggests the need for care in claiming that a given sampling is truly representative.

Probably it may fairly be said, however, that the results shown in this study are as representative of city seven-year elementary schools in Texas as the authors' norms are of eight-year elementary schools in the country at large. If we accept the one as having at least a tentative validity, we may accept the other. Naturally, we shall be willing to revise our figures as additional evidence comes to light.

It is possible, of course, that neither our results nor the authors' norms are as representative as we might wish them to be. Both are inevitably subject to a certain error of sampling. It will be recalled, for example, that the Otis Test and the National Intelligence Test gave rather different results in certain of our grades. This difference is probably in part the result of a difference in the sampling on which the tests were standardized.[7] These difficulties,

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[7]See Table VII and the accompanying discussion in *Supplement No. 2 to the Manual of Directions of the National Intelligence Tests* for information on the assembling of material for norms. Note the varying number of tests for the several cities and the distribution of the cities.

however, should not be taken too seriously. The point is not that we should reject the data, but that we should use them with due consideration of their limitations.

The casual reader may interpret the high standing of pupils on the intelligence tests as evidence that an unwarranted number of bright pupils were included in the testing. It must be remembered, however, that the pupils tested may have intelligence above the average represented by the norms and yet not above the average of a given school system. The following quotation from Supplement No. 3 to the *Manual of Directions* of the National Intelligence Tests sets forth the situation with reference to norms (pp. 2, 3):

> Universally applicable "norms" can not be established. There is a disposition among users of intelligence tests to regard an "age norm," a "mental age," a "standard score," or a table of "standard percentiles" as something that can be laid down with precision and finality and that can be directly used for reference in locating the pupil among his mates, especially for purposes of school classification. Theoretically, age and grade norms for the United States may be obtained; practically, the scores obtained for pupils of different races, different nationalities, and different communities differ more or less, and the difference may be of sufficient amount to necessitate the use of special norms for special purposes. In illustration, there are shown in Table II the average scores for pupils 11 years old in eighteen different school systems.
>
> Note, by comparing Table II and Table I, that in City A the 11-year-old pupils are, on the average, virtually identical in score with our "norm" for 12-year-old pupils, whereas in City P the 11-year-old pupils are on the average about six months younger (speaking in terms of "mental age") than our "norm," while the pupils in the small school system R are almost exactly two mental years lower than the pupils of the same chronological age in system A. The same divergences can be found within any large school system among the pupils in different buildings or different quarters of the city. All that can be said for the norms in Table

> I (or for similar norms published for other intelligence tests of school children) is that they represent fairly closely the averages that will be found in school systems generally when the results for cities, towns, villages, and rural communities are combined to afford a fair sampling of the public school population of the northern states.

It is not surprising that high scores in achievement are, on the average, accompanied by high scores in intelligence. If the opposite condition had been found, the situation would have been quite unusual. In the light of the close correspondence of the intelligence and achievement scores of the Otis Classification Test, which presumably have been standardized on the same pupils, too much significance should not be attached to the fact that the National Intelligence scores are higher than the Stanford Achievement scores.

If we knew how the ages of our pupils compared with the ages of all the pupils in the cities tested and similarly how the ages of pupils on whom the authors' norms are based compared with the ages of all the pupils in the cities tested for the norms, we should have a better basis for judging the factor of selection. In general, the younger pupils of a given grade are the brighter. Information is lacking, however, to make a reliable comparison on the age basis.

We are compelled, then, to accept tentatively the results of our tests as fairly representative of conditions in the city schools of Texas.

Miscellaneous Data

As explained in the first of the chapter, the superintendents were asked to furnish certain supplementary data "to assist in interpreting the statistical results." Some of these will be recorded here, although most of them have not proved particularly valuable in the solution of the main problem. Sixteen reports, in whole or in part, were available for tabulation.

The information given concerning the number tested in relation to the total enrollment in a given grade showed wide variation from very scant representation in some systems to almost complete representation in others. Since the report blank made no distinction between high and low sections, the exact percentage of representation for each city has not been computed. The total number of pupils tested (6,710), however, is a little less than 10 per cent of the total number enrolled in these grades during the year 1925–26 (67,222).[8] The total enrollment, of course, is greater than the number belonging at any given time.

Thirteen of the sixteen systems from which reports were available reported a school year of 180 days. The average for similar cities in the country as a whole was 185 days in 1923–24.[9] The other three of the sixteen cities reported 172, 176, and 176 days, respectively.

The salaries of elementary teachers (fifteen systems only) range from $908 to $1611, with a median of $1165. In 1924, the average annual salary of elementary teachers in cities of similar size in the country as a whole was $1675.[10]

Fourteen of the cities reported on the qualifications of the teachers. The number of years of training above the high school varies from a city mean of 1.6 to a city mean of 3.1, with 2.7 as the median of the several means. The mean number of years of experience (thirteen cities only) varies from below five (probably—exact figures lacking) to above thirteen, with eight as the median of the means.

Norms

One of the objectives of this study was the derivation of norms for seven-year elementary schools. In using the results of standard tests, school men of the State have been handicapped by the general lack of comparative norms expressed in terms of the seven-year school. The results of the testing program of this study make it possible to suggest

[8]Reports to State Superintendent of Public Instruction.

[9]U. S. Bureau of Education, Bull. 1925, No. 41, p. 1.

[10]*Ibid.*, p. 13.

tentative norms for the three tests used. It must be understood, of course, that these norms are city norms and that they are subject to the same limitations as those pointed out in the quotation, a few paragraphs back, from the Supplement to the *National Manual.*

The process of deriving norms is simply one of approximating from the actual results an ideal curve of progress, which presumably represents conditions as they would be without the unequal influence here and there of chance factors. The method is illustrated in Figure 11. The lower curve represents the author's grade norms in Part I of the Otis Classification Test. The dotted line represents the actual averages found in this study. The curve which roughly follows this line represents the norms suggested in the present study for city schools which have but seven grades below the high school. The numerical value of the norms for a given grade may be read by finding the grade number on the horizontal scale, then locating the intersection of the curve with the vertical line which passes through the grade number, and finally reading from the scale at the right or left the number immediately opposite the point of intersection. In grade 8.0, for example, the location of the norm (64) is shown by arrows.

Figures 12, 13, and 14 show the suggested grade norms for the Otis Classification Test, Part II, the National Intelligence Test, Scale A, and the Stanford Achievement Test.

The data of this study are not sufficient to make possible the derivation of norms for ages without reference to grade placement. Our sampling of pupils was made on a grade basis. This seemed to be the most direct and most practicable approach to the main problem. To secure a representative sampling on the age basis would require the assembling of data for a given age from a number of pupils

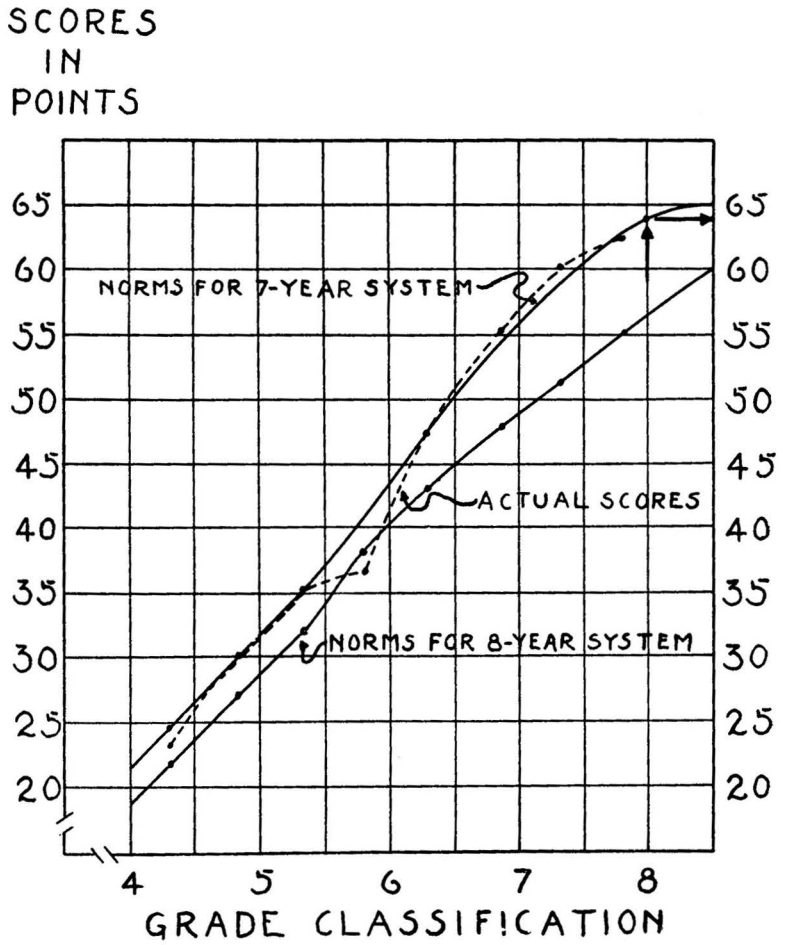

Figure 11.—Actual Scores and Norms for Otis Classification Test, Part I (Achievement).

The lower diagonal line represents present norms; the upper line, the seven-year-system norms derived from this study.

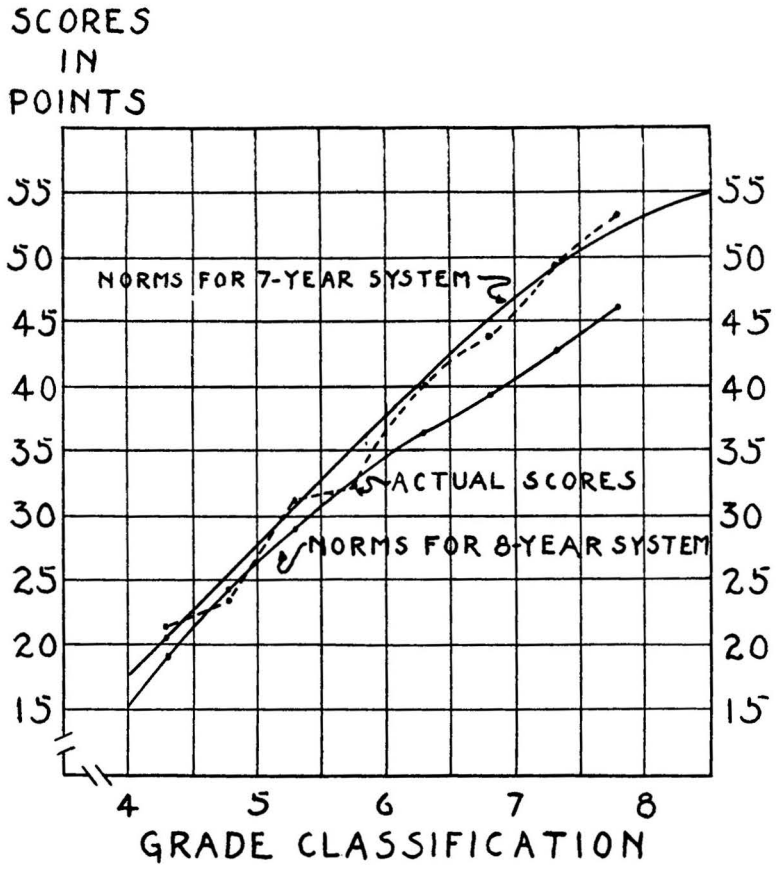

Figure 12.—Actual Scores and Norms for Otis Test, Part II (Intelligence).

The lower diagonal line represents present norms; the upper line, the seven-year-system norms derived from the study.

proportional to the total number of pupils of that age in each of the grades in which they appear. Our tests, however, cover only four grades, and in only five cities were they given to both high and low sections of all four grades.

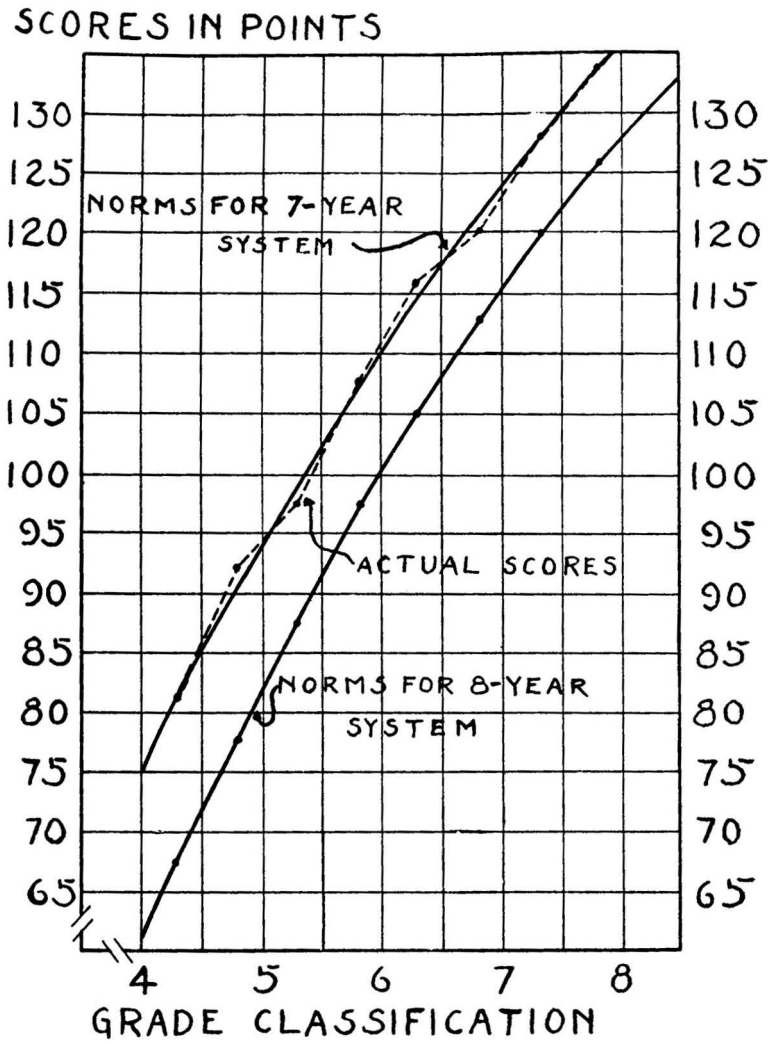

Figure 13.—Actual Scores and Norms for National Intelligence Tests, Scale A.

In plotting the authors' norms low sections only were used. The upper diagonal line represents the seven-year-system norms derived from this study.

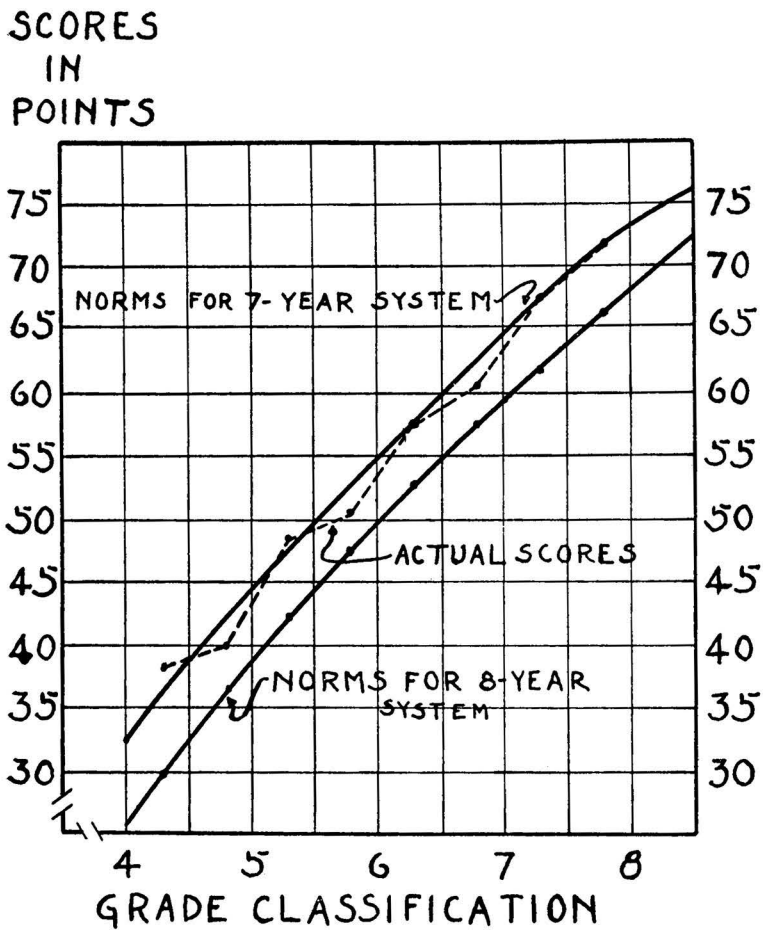

Figure 14.—Actual Scores and Norms for Stanford Achievement Test, Advanced Examination.

The upper diagonal line represents the seven-year-system norms derived from this study.

Furthermore, we do not know in every case that the sampling we have obtained from the several sections bears the proper proportion to the total number in each.

Table 16 presents the median scores and median mental and educational ages (National Intelligence Test and Stan-

ford Achievement Test only) of the 11-year old and the 12-year-old pupils of the five cities in which high and low sections were tested. In all probability the 11-year-olds below grade four would lower the 11-year-old average if they had been included, as the 12-year-olds above grade seven would raise the twelve-year average. As a general rule, the younger pupils of a given grade make the higher scores in both intelligence and achievement. For the reasons stated, then, the scores exhibited in Table XVI are probably unreliable from the standpoint of showing the true averages for pupils of these ages.

Such age norms as we are able to give, therefore, are based upon the average ages of pupils in the several grades rather than upon tables similar to Table XVI. Statistically, this is quite different from basing the norms on the average performance of children of given age levels. We have no way, however, of knowing from our data what the actual difference would be.

Table XVII presents the tentative grade and age norms derived from this study for city seven-year elementary schools. Values other than those given may be found by interpolation.

TABLE XVI

MEDIAN SCORES OF ELEVEN-YEAR-OLD PUPILS AND TWELVE-YEAR-OLD PUPILS, REGARDLESS OF GRADE PLACEMENT, IN FIVE CITIES

	Eleven-Year-Old Pupils				Twelve-Year-Old Pupils			
	National Intelligence		Stanford Achievement		National Intelligence		Stanford Achievement	
	Score	Mental Ages	Score	Ed. Ages	Score	Mental Ages	Score	Ed. Ages
City 1	110.9	12.6	55.4	12.4	116.4	13.0	57.5	12.5
City 2	95.8	11.7	46.0	11.5	117.4	13.0	57.8	12.6
City 3	103.1	12.1	48.6	11.7	108.3	12.5	53.8	12.1
City 4	100.0	11.9	49.5	11.8	111.1	12.6	54.5	12.2
City 5	103.8	12.1	48.6	11.7	110.9	12.6	54.0	12.2
Median of Medians	103.1	12.1	48.6	11.7	111.1	12.6	54.5	12.2
Norm	-------	11.5	------	11.5	-------	12.5	------	12.5

TABLE XVII

TENTATIVE NORMS FOR CITY SEVEN-YEAR ELEMENTARY SCHOOLS

		Otis Classification Test			Nat. Int. Test	Stanford Achievement Test						
Grade	Age	Pt. I	Pt. II	Total	Sc. A.	Total Score	Reading	Arithmetic	Na. St. and Sc.	Hist. and Lit.	Lang. Usage	Dictation
4.0	10.1	20	17	37	75	33	100	114	22	9	14	71
4.5	10.6	26	22	48	85	39	115	131	28	14	19	83
5.0	11.1	32	27	59	93	44	127	145	33	19	23	93
5.5	11.6	38	32	70	102	49	139	159	39	24	26	103
6.0	12.0	44	37	81	110	54	152	173	44	29	29	113
6.5	12.4	50	42	92	118	59	164	186	50	35	32	123
7.0	12.9	56	47	103	125	64	175	200	55	42	35	133
7.5	13.5	61	51	112	130	69	185	213	59	50	38	145
8.0	14.0	64	53	117	135	73	194	224	62	56	40	154
8.5	14.5	65	55	120	139	76	200	232	65	60	41	162

The table shows point scores for the several tests.

SUMMARY

This chapter has presented the results of intelligence and achievement tests of 6,710 pupils, distributed through the low and high sections of grades 4 to 7, inclusive, in from five to eighteen school systems of Texas. The scores on these tests have been taken to represent intelligence and achievement in the seven-year elementary schools of the cities of the State.

The standing of these pupils has been compared with norms based primarily upon scores from pupils of eight-year elementary schools (or schools having twelve years below the college level). Presumably, these norms are averages based upon tests in communities of large and small population in various parts of the country. From this comparison the following facts appear:

(1) The scores of our pupils on the two tests of intelligence and achievement are almost uniformly higher than the norms for eight-year-system grades of the same number.

(2) The Otis test of intelligence (Classification Test, Part II) shows in the middle grades a level of intelligence below that expected of pupils who are to complete an eight-year course in seven years, and in the last grade of the elementary school a level one or two months above this expected level.

The National Intelligence Test, Scale A, shows in the fourth grade a level of intelligence about two months higher than the expected level, and in the seventh grade about two months lower.

(3) The Otis test of achievement (Classification Test, Part I) shows in the fourth grade a level of achievement below that expected of pupils who are to complete an eight-year course in seven years, but in the seventh grade a level about two months above this expected level.

The Stanford Achievement Test shows in the fourth grade about the same level of achievement as is expected, and in the seventh grade a level about three months lower than is expected.

(4) As a general summary, it may be said that in the better seven-year elementary schools of Texas, pupils are completing the course with a level of intelligence and of achievement a little ahead of, or not more than a third of a year behind, that reached by the pupils in eight-year systems on whom the authors' norms have been based.

(5) Pupils in the Texas schools showed marked ability in "language usage" as compared with the norms.

The results of the tests have been used also in establishing tentative norms for city seven-year elementary schools.

CHAPTER V

RECOMMENDATIONS

In the preceding chapters of this monograph the history of the eleven-year period of elementary and secondary education in Texas has been briefly discussed, the findings of a few investigations of achievement have been outlined, and the results of a coöperative study of achievement in Texas city schools have been presented. The historical study shows that the seven-year elementary school and the eleven-year period of elementary and secondary education became the prevailing ones in Texas after considerable trial of this and other plans. In the studies of achievement the weight of evidence indicates that, in the abilities measured, pupils in the better seven-year elementary schools accomplish almost as much as the eight-year-system pupils on whom the test norms are based, and that college students coming from eleven-year systems suffer little or no handicap as measured by college grades.

It is fair to state, however, that the evidence on the high achievement of seven-year elementary pupils is not without exception. The Port Arthur survey, for example, and in some schools the Texas survey, found achievement far below the norms. Probably among seven-year schools we find just the same variation in intelligence and achievement that we find among other schools—some are well above the norms, some are average, and others are below. Various factors, such as the length of the school year, the training of teachers, and the endowment of pupils, contribute to this result. Differences are to be expected. In *Supplement No. 3 to the Manual of Directions of the National Intelligence Tests*,[1] Whipple points out two contrasting communities, in the first of which the average mental age of eleven-year-old pupils was about a year and a half greater than that of a similar group in the second city. Doubtless a like variation could be found in Texas schools.

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[1]See quotation in preceding chapter.

THE ISSUE

What then shall we do? As we have seen, the seven-year elementary school and the eleven-year period of elementary and secondary education are the prevailing ones in Texas. So far as this State is concerned, the practical question is on the abandonment of this plan and the adoption of a twelve-year program in its stead.

At this point our discussion shifts from fact to opinion, from evidence to argument. Statistical findings are not applied automatically. We may agree on the facts of achievement and yet come to radically different opinions when we interpret our findings in terms of school organization. A great deal depends upon one's philosophy of education, upon one's interests, upon other facts to which one is attentive, and upon subtle determinants of judgment that are more or less obscure. The writer, of course, claims no special insight which should give his opinions unusual weight. They are worth only the degree of acceptance that their reasonableness warrants.

According to the laws of debate the burden of proof lies with those who favor a change from the present eleven-year plan. Before agreeing to a change we must be sure that the new plan would probably bring substantial gain without corresponding loss.

The present system has another advantage in the argument besides that which the laws of debate give it. To add one year to the period of public education is *a priori* to increase the burden of taxation. It seems reasonable to expect that a twelve-year school would cost more than an eleven-year school.[2] Whether this is true in fact is a matter for study. Until the figures are available, however, we should act on the safe side and hesitate to place this extra year on the schools. On the other hand, the probable expense of an extra year should not deter us, if our inquiry clearly establishes the need for a change. Public education is not an institution for saving money but for investing it.

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[2]See Introduction for reference to Kansas City.

Alternate Plans of Organization

The relation of the seven-year elementary school to the junior high school deserves consideration at this point. As indicated in a previous chapter, the fact that the elementary schools have only seven years was given in the Texas Educational Survey Report as one reason why the junior high school has spread less rapidly in Texas than in many of the other states.[3] It is easy to understand, then, that enthusiastic advocates of the junior high school might see in the proposed extension of the seven-year elementary school a means of promoting their cause.

The desirability of organizing the junior grades into separate administrative units, except in the larger cities, may itself be a matter for discussion; but even if the desirability were admitted we could easily show the possibility of such an organization in an eleven-year system. There are, in fact, such organizations in Texas schools.

That the twelve-year system is a more convenient one for dividing into three administrative units—if indeed it is—is of small consequence. Administrative convenience is not a sufficient basis for determining the organization or content of education. As a matter of fact, fundamental educational objectives can be reached through different plans of organization.

The junior high school movement has done a great deal to improve the educative process in the junior grades. But the externals of the organization are the least important features of it. The significant changes are those which occur in educational objectives, in curriculum, in method, and in the spirit that pervades these grades. There are so-called junior high schools which are as barren educationally as the organizations they have supplanted. On the other hand, it is possible to have the things for which the best junior high schools stand without separate principals and separate housing. The last sentence of the

[3]In the Texas Survey Report, however, the writer has found no evidence that the surveyors desired a change to a twelve-year system.

following quotation from the report of the committee on junior high school mathematics in the *Fifth Yearbook (1927) of the Department of Superintendence,* p. 182, is worthy of careful attention:

> The committee on junior high-school mathematics accepts the thesis that the objectives of education are the objectives of the junior high school, and that ,therefore, the junior high school is an integral part of the public school system. It believes that the junior high school may and in most instances does provide a better means of carrying on to fruition the civic, social, and moral ideals of education than the old 8-4 plan. While recognizing the importance of the administrative and purely social features of the junior high school, the committee considers the reorganization of the content and method of courses of study to be the most essential requirement in meeting educational objectives.

In the present state of the science of school administration, it cannot be positively asserted than a six-three-three or a five-three-three plan of administration is the best one for Texas schools. In the October, 1927, number of the *Texas Outlook,* p. 17, President Doughty of the Junior College at Hillsboro suggests an interesting five-four-four plan, which includes the junior college. He describes the plan as follows:

> Accordingly three groupings are made in the curriculum to conform to the three recognized periods of adolescence, which are as follows: pre-adolescence, from 7 to 11 or 12; early adolesence, from 11 or 12 to 15 or 16; and later adolescence, from 15 or 16 to 19 or 20.
>
> The first grouping is, of course, the elementary school, which is organized to include grades one, two, three, four, and five, and is set apart for the learner of pre-adolescent age. The second grouping includes grades six, seven, eight, and nine, and is designated as the junior school and is adapted to appeal to the youth of early adolescent age. The third grouping includes grades ten and eleven of

> the traditional high school, together with the freshman and sophomore years of college, ordinarily misnamed the junior college, and is designated the senior school, being adapted to later adolescence.

Much may be said, also, for a plan of organization which includes the junior and senior grades in one unit. Some of these advantages are suggested by the report of the Port Arthur survey, in which the staff recommended a junior high school but pointed out reasons why it should be located near the senior high school (Report, pp. 275, 276):

> From an administrative point of view the simplest and most economical method for securing the large variety of courses suggested for the junior high school would be to make provision for all the seventh, eighth, and ninth grade pupils on the present high school grounds.
>
> While it is true that the plan outlined for the seventh and eighth grades can be approximated with a junior high school in other locations, many more forceful arguments can be put forward in favor of the placing of the new junior high school on the present high-school grounds. In the broadening and finding work some of these points would be:
>
> 1. Pupils in the lower grades seem to profit greatly by seeing the kind of work that is being done by pupils of senior high-school grades and are inspired to emulate them. . . .
> 2. From an administrative point of view the six-year arrangement will be found particularly desirable for the broadening and finding work. The high-priced, well-prepared instructors who know the work of the upper grades, and who, in an ordinary high school teach only the smaller classes of the junior and senior years, will devote part of their time to the larger classes in the broadening and finding work. . . .
> 3. From the points of view of the various departments the arrangements used in the six-year school will, in the opinion of the staff, prove most acceptable. . . .
> 4. From a financial standpoint the one-plant arrangement offers decided advantages, since the

> schedule of the broadening and finding courses can be so arranged by six-week periods, and the number of pupils taking each so determined that no shop, classroom, or laboratory need be unused at any period of the day. Then, too, the auditorium and athletic facilities can be put to maximum use for both schools, and much duplication of equipment in such courses as science, home economics, and shops can be eliminated.

Another advantage of making few administrative units in the public school system is that of continuity. The junior high school has been urged as a method of bridging the gap between the elementary grades and the high school, a gap resulting in part from the different origin of the two schools and in part from different administrative control. In proportion as we give the units of our educational system independence in administration, we may expect misunderstanding, divergent purpose, and maladjustment. In any comprehensive reorganization of our schools, we need to devise some plan that will provide a continuity running from the nursery school or kindergarten through the university or other unit from which a pupil leaves to enter his life work.

Achievement and the Length of Schools

In the coöperative study reported in the preceding chapter, the achievement of seven-year elementary schools was compared with norms for eight-year schools. This does not mean, however, that the writer accepts the eight-year norms as desirable in all schools or even as altogether desirable in the schools in which they are being reached. Majority practice is not sufficient guarantee that the thing which is actually being done is the thing which should be done. In the conduct of human enterprises it is easy to place too great dependence upon consensus of practice and opinion.

It should be remembered, of course, that our survey has included only a part of the work which schools are trying to accomplish. It is quite possible that the measurements which have been made are not an adequate indication of

accomplishment in general. It is certain, too, that many Texas schools are below the standard represented by the average. There are, however, different methods of attacking our difficulties.

Even if a given city in a series of tests should fall below a standard regarded as desirable, probably the first solution of the difficulty should be sought elsewhere than in an extension of time. Perhaps if attention were placed upon *improvement* of the system, a considerable portion of the handicap in test scores would eventually be removed.

Again, the argument for the insertion of an eighth grade because pupils are deficient in certain branches at the close of seven years fails to take properly into account the desirability of continuity in the educative process. It implies too much of a break between elementary and secondary education. If we believe in the continuity of education and act intelligently upon this principle, we need not be greatly concerned as to whether pupils have reached the ultimate goals at the end of seven or eight years—provided the progress which has been made is a maximum for the time employed. In this case, there will be no sharp cessation of learning in the "fundamentals" at the end of a specific number of years. As a matter of fact, even under present conditions in which pupils are supposed to drop arithmetic, reading, spelling, and the like at the end of the elementary period or the close of the junior grades, improvement in certain subjects seems to continue through the high school. The following tables, for example, show the grade norms for the Thorndike-McCall Reading Scale and the Otis Classification Test, Part I (achievement).

TABLE XVIII

GRADE NORMS IN THE THORNDIKE-MCCALL READING EXAMINATION

(Prepared from *Manual of Directions*, p. 4)

Grades	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A
T-Scores	26	34	40	45	51	56	60	62	63	65	67

Scores are recorded as of the nearest whole number.

TABLE XIX

GRADE NORMS IN OTIS CLASSIFICATION TEST, PART I

(Prepared from Author's "Grade Status Values")

Grades	4.0	5.0	6.0	7.0	8.0	9.0	9.9
Scores	19	29	40	49	57	63	67

Probably the increase in scores in the high school is in part the result of the elimination of less able pupils, but the same thing may be said of scores in all grades beyond the sixth. Either elimination does not account for all of the increase, or else there is little growth beyond the seventh grade of eight-grade systems in the abilities measured by these tests.

The twelve-year plan is said to provide "a more nearly proper amount of time for enriching the child's school life," and to make possible "a flexibility of program which is difficult to realize in the eleven-year system." With this desire to prolong the period of education, the writer is in hearty agreement. The question is in the method. The position here taken is that the increase in the offering of the schools should be made by extending the system downward and upward rather than by inserting an eighth grade between the present elementary school and the high school.

The real limit upon the time that an individual should spend in the schools is set by social and economic conditions. It is obviously the business of the schools to provide both sufficient and well-directed educative opportunity covering this period. The ideal organization is that which submits the individual to a curriculum adapted to his needs, stimulates him to his best efforts, and provides for a breadth, quality, and speed of achievement adjusted to his ability.

SOME CONSTRUCTIVE SUGGESTIONS

Some believe that the accomplishment of this ideal is best attained by an extreme individualization of instruction.[4]

[4]See, for example, Part II of the *Twenty-fourth Yearbook of the National Society for the Study of Education*, "Adapting the Schools to Individual Differences."

It is assumed here, however, that a grade organization will be maintained. The problem, then, becomes one of finding the organization that is best suited to the needs of Texas schools. It is altogether probable that this organization will vary more or less with local conditions. The outline which follows is a kind of generalized scheme which the writer believes to be worthy of consideration by administrators.

1. Children should be admitted to the schools at five-and-a-half years of age (at five if a full year of kindergarten is maintained).[5] One of the most effective ways to increase the period of public education is to start children at an earlier age. In many cases the age at which children leave the school is determined and will continue to be determined by social-economic conditions that are difficult to control. The additional time added to a child's school life in his early years can be made of tremendous value.

2. The educative activities in which these young children first engage should be those that are now characteristic of the best kindergartens. The objectives of this early primary education—socialization, information, language, art, sensori-motor skill, and the like—should be definitely outlined and energetically sought.

3. The first work of these beginners should be organized as an integral part of primary education—rather than provided for by separate units known as "kindergartens." Both in dealing with parents who want to know whether their children are doing kindergarten or first-grade work and in promoting the continuity of the educative process, we shall by this method gain a decided advantage.

4. As the children show attainment of the objectives of this early primary work and as they show ability to do the fundamental work now characteristic of the best first grades, they should be advanced to this type of work. The old chronological-age method of determining when a child should be taught to read is wrong. The organization here suggested makes possible a classification and treatment of

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[5]Nursery schools established to meet local conditions will, of course, take children much younger.

pupils according to ability and need regardless of age. School experience indicates that an average child from six to six and a half may be expected to do the traditional first-grade work. The majority of children, then, may be expected to complete the early primary work in about one-half year if they enter at five and a half.

5. On the assumption that children enter at five and a half, about six and a half years should be regarded as the period of elementary education. This does not mean that the methods, curriculum, and objectives should be suddenly changed at the close of the elementary period. Quite the contrary is true. It cannot be too strongly emphasized that education should be continuous at every stage. The seventh year should be only a little different from the sixth. It is absurd, for example, to discontinue arithmetic suddenly and shift completely to the traditional algebra. Nor does it mean that all should be put through on the same curriculum or time schedule. If modern education has taught one lesson more emphatically than others, it is that adequate adjustment must be made to individual differences.

To this point the plan has provided for children of ages up to twelve or twelve and a half and for grades through the sixth.

6. Beginning about the seventh grade, with the age of entrance as suggested, the need becomes acute for the differentiation and the special provisions which are now characteristic of the best junior high schools. An integrated junior-senior program covering five years (six or seven if the community can afford extension into the junior-college field) should be organized. Whether the units should be housed separately and provided with separate and distinct administrative machinery is a matter to be decided by local conditions. The essentials are two: continuity and real adaptation to the needs at each level.

7. In years nine, ten, and eleven of the program, provision should be made for college entrance requirements. But the program at every point should serve also those whose academic future is more circumscribed. The best

junior-senior programs are rich in opportunities for individuals of varying interest, abilities, and circumstances.

So far as the college-preparatory function of a school system is concerned, the evidence shows that eleven-year systems are apparently discharging it almost, if not quite as well as twelve-year systems. In the smaller communities educational opportunities can be increased by enrichment on the level of the present schools and in the larger communities both by enrichment and by extension upward.

Conclusion

In the judgment of the writer, the eleven-year school systems of Texas should not be expanded into twelve-year systems by the addition of an eighth grade. This is not the remedy for our difficulties. Until contrary evidence is more convincing, this great experiment should be allowed to stand. This experiment is in harmony with the desire of the Committee on the Economy of Time in Education to prepare men and women for entrance to the professions at an earlier age. The extension of school opportunities in the local community need not and should not interfere with this purpose.

If surveys find our achievement below that which is expected for the time and effort we spend, let us improve our processes. If, on the other hand, we are doing well year for year the work we are attempting, let us examine our objectives to see whether at each stage we are doing the things which we should be doing. In any case let us refrain from excusing remediable weaknesses by the protest that our time is too short. A thoroughgoing reorganization and integration of school activities is much more fundamental and much more hopeful than increasing the length of the system by the insertion of an eighth grade.

CHAPTER VI

FURTHER RESEARCH

At one point in the last chapter the seven-year elementary school of Texas was called an experiment. In a sense it is just that. It is a modification of school organization on a large scale. It should receive careful study, particularly in comparison with the prevailing eight-grade system. If in another state a research worker should announce the dropping of a school year for experimental purposes, the announcement would be greeted with great interest. Here the experiment has been set for us. It would, then, be inexcusable to let it pass with scant notice. It is a project worthy of the serious consideration of individuals who themselves desire to participate in the study of school problems and of others who have the direction of personnel or funds for educational research.

The problems of education in seven-year schools are in many respects the same as those found in other schools. These common problems are many; we need not list them here. It may be helpful, however, to suggest a few problems which come from the unique situation presented by the seven-year plan of organization. The list that follows is intended to be suggestive only:

1. What is the history of the seven-year elementary school and of the eleven-year period of elementary and secondary education in Texas?
2. What are the social and philosophical implications of a shortened period of schooling below the college level?
3. What is the relative success of eleven-year-system pupils and twelve-year-system pupils in college? The work of the Southern Association on this topic should be extended.
4. What is the relation of entering age to college success? What is the optimum age for entrance to various types of higher institutions of learning?

5. How is the product of an eleven-year-system assimilated in the community? What further schooling, if any, do social and economic conditions suggest as desirable?

6. What should be the organization and content of the curriculum in eleven-year-schools? Where, for example, should the emphasis shift from elementary to secondary subjects? What modification should be made in literary selections and the like on account of age?

7. What are the special problems of retardation and elimination in eleven-year schools? Where, for example, are the crucial points? What is the age-grade progress through these schools?

8. What curve of growth in mentality and achievement do individual pupils show in eleven-year schools?

9. What differences in mentality and achievement are found with differences in entering age? In what respect, for example, does the curve of growth of the child who enters school at eight differ from that of the child who enters at six?

10. If the age of entrance is lowered, what type of educational activities should be supplied for the early years? What loss will there be, for example, if a child is not taught to read before the age of seven or eight?

11. What are reasonable norms of attainment on various standard tests for different ages and grades?

12. How does the accomplishment of pupils between 6 and 13 compare with that of pupils between 7 and 14?

13. What is the difference in costs of eleven-year and twelve-year schools?

14. Should we make a difference in the length of elementary education for colored children? For Mexican children?

15. What are the proper administrative units of an eleven-year system, and of an eleven-year system in a city having a public junior college.

Most of the suggested problems are large ones which can best be attacked in smaller segments. The great need is for painstaking investigations that contribute results of scientific validity; and, of necessity, this usually means work in

a relatively narrow field. Administrators, to be sure, will need to make immediate practical adjustments which assume tentative answers to complicated questions; but the scientific student must continue to collect, bit by bit, the evidence that is required for validating and improving present practice. The desire for quick results and practical applications must not be allowed to divert energy from fundamental research. Moreover, the ambition of one who desires to contribute something to the solution of these problems should rise higher than the collection of opinion through the traditional questionnaire. We need, too, a quickening of interest in laboratory and classroom experimentation and in a detailed study of limited fields that will shift the emphasis somewhat from surveys and from more or less superficial work with mass data.